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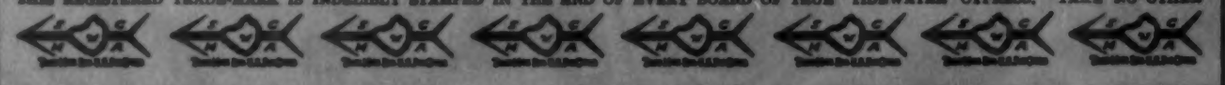

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THE ARCHITECTURAL FORUM

AN ILLUSTRATED ARCHITECTURAL MONTHLY DEVOTED TO THE ART, SCIENCE AND BUSINESS OF BUILDING

ROGERS AND MANSON COMPANY, Publishers

NEW YORK BOSTON CHICAGO

INDEX TO VOLUME XXXIII JULY TO DECEMBER INCLUSIVE, 1920

Index to Plate Illustrations According to Subject

Plates numbered 1–16, July; 17–32, August; 33–48, September; 49–64, October; 65–80, November; 81–96, December

PUBLIC BUILDINGS

Title, Location and Architect	Plate No.
ADMINISTRATIVE AND GOVERNMENTAL	
Courthouse, Hamilton County, Cincinnati, Ohio, Rankin, Kellogg & Crane	39–45
Fire Station, Central, Malden, Mass., Charles R. Greco	8, 9
Fire Station, Brighton, Mass., Maginnis & Walsh	7
City Hall, Plattsburgh, N. Y., John Russell Pope	85–88
AUDITORIUM	
Portland Public, Portland, Ore., J. H. Freedlander and A. D. Seymour, Jr., Assoc	1–6
PUBLIC UTILITIES	
Compton Hill Reservoir, St. Louis, Mo., Guy Study & Benedict Farrar	64
THEATERS	
Parkway, Baltimore, Md., Oliver B. Wight, Architect	89

EDUCATIONAL BUILDINGS

COLLEGES AND UNIVERSITIES	
Building for the Peabody Collection, Phillips Academy, Andover, Mass., Guy Lowell	73, 74
LIBRARIES	
Dovercourt Branch, Toronto, Canada, Chapman & McGiffin	32
Tobey Memorial, Wareham, Mass., E. M. Parsons & Co.	70, 71
SCHOOLS	
Girls' Dormitory, Principia School, St. Louis, Mo., William B. Ittner	63
Lower School Building, Principia School, St. Louis, Mo., William B. Ittner	61, 62

RELIGIOUS BUILDINGS

CHAPEL	
St. James', Cathedral of St. John the Divine, New York, N. Y., Henry Vaughan	58–60
CHURCHES	
Our Lady of Lourdes, St. Louis, Mo., Study & Farrar	29, 30
The Redeemer, Milwaukee, Wis., Schuchardt & Judell	72
Grace Evangelical Lutheran, Minneapolis, Minn., Cecil Chapman	31

INSTITUTIONAL BUILDINGS

Hutton Orphanage, Spokane, Wash., Whitehouse & Price	81–84
Montefiore Home, Cleveland Heights, Ohio, Charles R. Greco	67–69

RESIDENTIAL BUILDINGS

APARTMENTS	
101 Chestnut St., Boston, Mass., Richard A. Fisher	94–96
Concourse and 183d St., New York, N. Y., Andrew J. Thomas	46, 47
Sheridan Road, Chicago, Ill., R. E. Schmidt, Garden & Martin	65, 66
Carlton, Baltimore, Md., Parker, Thomas & Rice	12
Emersonian, Baltimore, Md., Joseph Evans Sperry	10, 11
COUNTRY AND SUBURBAN	
Brown, Lathrop, Esq., St. James, L. I., N. Y., Peabody, Wilson & Brown	33–38
Clark, Raymond S., Esq., Great Neck, L. I., N. Y., Alfred Hopkins	79, 80
Columbus, Ohio, Richards, McCarty & Bulford	75–78
Davis, Mrs. H. J., Scarsdale, N. Y., W. Stanwood Phillips	25–28
Kelley, William V., Esq., Lake Forest, Ill., Howard Shaw	17–24
Meyer, Eugene, Esq., Mt. Kisco, N. Y., Charles A. Platt	49–54
Outerbridge, Samuel, Esq., Oyster Bay, L. I., N. Y., Electus D. Litchfield	55–57
Parks, Dr. W. R., Evanston, Ill., Tallmadge & Watson	48
Rockford, Ill., Chatten & Hammond	13, 14
Wardwell, Mrs. I. F., Stamford, Conn., Aymar Embury II	90, 91
Whitehead, James T., Esq., Detroit, Mich., Charles M. Baker	92, 93
Williams, N. W., Esq., Evanston, Ill., Spencer & Powers	15, 16

Index to Articles

Pages numbered 1–38, July; 39–76, August; 77–114, September; 115–154, October; 155–194, November; 195–232, December

	Page
*Apartment House of Distinctive Design, 101 Chestnut St., Boston	211
*Apartment Houses at Jackson Heights, N. Y., Andrew J. Thomas, Architect	29
*Alteration for a Restaurant, A Successful, George F. Shepard, Architect	21
*Automobile Sales & Service Buildings, Planning of, by F. A. Fairbrother.	
Part I	39
Part II	93
*California Architecture, Some Recent, Louis C. Mullgardt, Architect	51

Articles marked (*) are illustrated

378315

Index to Articles—*Continued*

	Page
*Cottage Planned Orphanage—The Hutton Settlement, Spokane, Wash., by H. C. Whitehouse	205
*Cunard Building, The, Benjamin W. Morris, Architect	1
Draftsman's Own Data File, by H. Vandervoort Walsh	201
*Early American Domestic Architecture.	
II. The Wellington House near Waltham, Mass., Edwin J. Hipkiss	101
III. The Warner House near Chester, Conn., J. Frederick Kelly	175
IV. The Jessup House, Westport, Conn., Oliver Reagan	219
*England, Notes from, H. J. Birnstingl, A.R.I.B.A	167
National Shipyards Housing Scheme at Chepstow.	
*English Churches, Some Lesser, by R. Randal Phillips,	
Gilbert Scott, A.R.A., Architect	115
*House for Practical Convenience, A, Charles Z. Klauder, Architect	183
*House at Mount Kisco, N. Y., Charles A. Platt, Architect	123
*House in the Southern Colonial Style, A, Peabody, Wilson & Brown, Architects	89
*Interior Woodwork, by Richard B. Derby,	
Part I. General Principles Which Underlie Development of Colonial Style	77
Part II. The Development of the Northern Version of the Colonial	131
*Italian Renaissance Details, A Collection of Measured Drawings by William D. Foster	143
Le Brun Traveling Scholarship Competition	114
*"Lugger's Hill," by Harold D. Eberlein, Andrew N. Prentice, Architect	45
*Modern Cotswold at St. Martins, Pa., by Harold D. Eberlein, Duhring, Okie & Ziegler, Architects	7
National Certification of Architects, by W. W. Beach	150
*Piranesi—Style Maker, by Richard F. Bach	61
*Schoolhouses in Massachusetts, by William Roger Greeley	155
*St. James' Chapel, Cathedral of St. John the Divine, Henry Vaughan, Architect	121
*Stone Pavement, The Decorative Function of the, by Harold Donaldson Eberlein	195
Swiss Country House, A Modern, Ernest Kuhn, Architect	171

DEPARTMENT OF ARCHITECTURAL AND BUILDING ECONOMICS, C. STANLEY TAYLOR, ASSOCIATE EDITOR

	Page
Applying the Co-operative Method of Financing to Inexpensive Types of Apartment Buildings	111
Banker's Analysis Shows Active Period of Construction Coming	193

DEPARTMENT OF ARCHITECTURAL AND BUILDING ECONOMICS—*Continued*

	Page
Building Construction Field, Encouraging Conditions in	147
*Co-operative Apartment Buildings, Successful, by Frederic Culver	187
Co-operative Apartment Purchase, A Definite Example of	35
Co-operative Ownership to Meet the Present Shortage of Buildings, Part II	31
Co-operative Plan of Apartment Ownership, Interesting Points from Official Investigation	55
Constructive Analysis of the Building Situation	60
Cost-Plus Building Contract, the Placing of a, Part I	190
Cost-Plus Building Contract, the Placing of a, Part II	227
Development of Architectural Practice through Local Co-operation, The	109
Export Trade and the Building Situation	59
Financing Home Building Projects, Practical Methods of	57
Increased Building Costs, Elements of	36
Optimism as to Business Conditions, A Note of	112
"Selling" Architecture to the "Man on the Street," by S. Howard Myers	192
Senator Calder Places Construction First in National Rehabilitation	491
Sound Reasons for Optimism	229
Standard Building Codes, The Question of	230

DEPARTMENT OF ENGINEERING AND CONSTRUCTION, CHARLES A. WHITTEMORE, ASSOCIATE EDITOR

	Page
*Automobile and the Private Estate, Parts IV and V, by Tyler Stewart Rogers	23, 69
Building Foundations, Parts I and II, by J. R. Worcester	83, 213
*Sprinkler Installation for Fire Protection, Part I, by W. D. Brown, C. E.	26
Part II	73
Part III	85
Part IV	139
*Tile and Its Installation, Part I, by E. Stanley Wires	137
Part II	163
*Truss Design and Details, Part I, by Charles L. Shedd, C.E.	161
Part II	215

DEPARTMENT OF INTERIOR DECORATION

	Page
*House Designed in the Italian Style, A, Richardson, Barott & Richardson, Architects	17

Articles marked (*) are illustrated

Subject Index to Illustrations in Letter Press

Pages numbered 1-38, July; 39-76, August; 77-114, September; 115-154, October; 155-194, November; 195-232, December

ARCHITECTURAL DESIGN AND DECORATION

Title, Location and Architect	Page
Altar of Catholic Church, Ramsey, Isle of Man, England, Gilbert Scott, A.R.A.	118
Altar of St. Mary's Church, Douglas, Isle of Man, England, Gilbert Scott, A.R.A.	118
Chamber in the Hannah Robinson House, Saunderstown, R. I.	78
Chimney-Pieces and Fireplaces by Piranesi	63–68
Colonial Detail in a Recent House at Concord, Mass., Frohman, Robb & Little	81
Detail from Jeremiah Lee House, Marblehead, Mass.	81
Detail of Restoration Work, Old House at Bolton, Mass., Bigelow & Wadsworth	134
Detail of Parlor in Hannah Robinson House, Saunderstown, R. I.	82
English Cottage of Early Georgian Character, Old	152
House Designed in the Italian Style, A, Richardson, Barott & Richardson	17–20
Interior from Late Eighteenth Century Precedent, Derby & Robinson	135
Interior, Santa Maria in Cosmedin, Rome	196
Interior of the Early Type in Seventeenth Century House, Ipswich, Mass.	79
Interior Showing Decorative Use of Tile, Richard Arnold Fisher	166
Living Room, House at Chestnut Hill, Mass., in Late Seventeenth Century Style, Derby & Robinson	136
Mantels from Old Cotswold Houses, England	204
Modern Hallway, Derby & Robinson	80
Modern Use of Simple Rail and String Detail, Howell & Thomas	135
Paving Details from Cathedral, Siena, Italy	196–199
Room in the Fowler House, Danversport, Mass	80
Room in Hannah Robinson House, Saunderstown, R. I.	131
Stairway in the George Cabot House, Beverly, Mass	133
Stairway, Hancock-Clark House, Lexington, Mass	132
Stairway in Present-Day House, Newcastle, N. H., Little & Brown	134
Stairway in the Hannah Robinson House, Saunderstown, R. I.	133
Stairway Window, Pierce-Nichols House, Salem, Mass	132

Subject Index to Illustrations in Letter Press—*Continued*

EARLY AMERICAN ARCHITECTURAL DETAILS

Title, Location and Architect — Page

Jessup House, The, Westport, Conn. Measured drawings by Oliver Reagan . . . 219–226
Warner House, The, near Chester, Conn. Measured drawings by J. Frederick Kelly . . . 175–182
Wellington House, The, near Waltham, Mass. Measured drawings by Edwin J. Hipkiss . . . 101–108

ITALIAN RENAISSANCE ARCHITECTURAL DETAILS

Measured Drawings by William D. Foster

Detail of the Palazzo Uguccioni, Florence, Italy . . . 143, 144
Two Florentine Façades, Palazzo Antinori and Palazzo Davanzati . . . 143, 145, 146

PUBLIC BUILDINGS

BUSINESS AND COMMERCIAL

Cunard Bldg., New York, N. Y., B. W. Morris, Carrère & Hastings, Consulting . . . 2–6
Ford Agency for R. P. Rice, Kansas City, Kan., Smith, Rea & Lovitt . . . 97
Ford Motor Co., Omaha, Neb., Albert Kahn . . . 93
Noyes-Buick Co., Sales and Service Bldg., Boston, Mass., Arthur H. Bowditch . . . 99, 100
Packard Motor Car Co., Building for, Hartford, Conn., Albert Kahn . . . 41
Willys-Overland Co., Sales and Service Bldg., San Francisco, Calif., Mills, Rhines, Bellman & Nordhoff . . . 43
Willys-Overland Co., St. Louis, Mo., Mills, Rhines, Bellman & Nordhoff . . . 95

MUSEUM

Golden Gate Park, San Francisco, Calif., Louis C. Mullgardt . . . 51, 52

RESTAURANT

Wedgwood, for The Ginter Co., Boston, Mass., George F. Shepard . . . 21, 22

EDUCATIONAL BUILDINGS

SCHOOLS

Banks, Waltham, Mass., Kilham & Hopkins . . . 157
High School, Taunton, Mass., Kilham & Hopkins . . . 159
Kindergarten Building, Wellesley, Mass., Kilham & Hopkins . . . 155
Lincoln School, Framingham, Mass., Kilham & Hopkins . . . 158

RELIGIOUS BUILDINGS

CHAPEL

St. James', Cathedral of St. John the Divine, New York, N. Y., Henry Vaughan . . . 121, 122

CHURCHES

St. Nicholas, Sheringham, Norfolk, England, Gilbert Scott, A.R.A. . . . 120
St. Paul's Church, Derby Lane, Liverpool, England, Gilbert Scott, A.R.A. . . . 116, 117
West End Catholic, Northfleet, Kent, England, Gilbert Scott, A.R.A. . . . 119

INSTITUTIONAL BUILDINGS

Hutton Settlement, Spokane, Wash., Whitehouse & Price . . . 205–210

RESIDENTIAL BUILDINGS

Title, Location and Architect — Page

APARTMENTS

101 Chestnut Street, Boston, Mass., Richard Arnold Fisher . . . 211, 212
Jackson Heights, N. Y., Andrew J. Thomas . . . 29, 30
East 66th Street, New York, N. Y., Charles A. Platt . . . 188
563 Park Avenue, New York, N. Y., Walter B. Chambers . . . 189
863 Park Ave., New York, N. Y., Geo. Mort Pollard . . . 189

CITY HOUSES

Pleadwell, Mrs. Theodosia, Washington, D. C., Clarke Waggaman . . . 75
President's House, Leland Standford Jr. University, Palo Alto, Calif., Louis C. Mullgardt . . . 53, 54

COUNTRY AND SUBURBAN

Belmont, Mass., Stanley B. Parker . . . 153
Brown, Hon. Lathrop, St. James, L. I., N. Y., Peabody, Wilson & Brown . . . 89–92
Hartsdale, N. Y., Caretto & Forster . . . 21
"Lugger'sHill," Broadway in Worcestershire, England, Andrew N. Prentice . . . 45–50
Merchantville, N. J., Charles Z. Klauder . . . 183–186
Meyer, Eugene, Esq., Mt. Kisco, N. Y., Charles A. Platt . . . 123–130
St. Martins, Pa., Cotswold Houses at, Duhring, Okie & Ziegler . . . 7–16
Swiss Country House, Ernest Kuhn . . . 171–174
Wurts, Pierre Jay, Esq., Englewood, N. J., Hays & Hoadley . . . 37

INDUSTRIAL HOUSING

Houses at Chepstow, England, Henry E. Farmer, F.R.I.B.A. . . . 167–170

Index to Frontispieces

Month

Mt. Vernon Street, Boston, Mass., from the lithograph by A. H. Hepburn . . . July
Park Street Church, Boston, Mass., from the lithograph by A. H. Hepburn . . . Aug.
Interior of Harvard Hall, Harvard Club, New York, N.Y. Harold R. Shurtleff . . . Sept.
Looking South from Washington Square, New York, N. Y., Harold R. Shurtleff . . . Oct.
Illumination of Public Library, Victory Celebration, N. Y. C., Harold R. Shurtleff . . . Nov.
Woolworth Tower and St. John's Chapel, Varick St., N. Y. C., Harold R. Shurtleff . . . Dec.

Editorial Comment

Page

The Situation Confronting Building . . . 38
Architects and Engineers . . . 76
Sick Housing Conditions . . . 114
The Architect's Political Duty . . . 154
What Should Architects Advise Regarding Construction . . . 194
Joint Registration Laws . . . 234

Index to Plate and Page Illustrations—According to Author

Architect — Address	Plate	Page
Bigelow & Wadsworth, Boston, Mass.		134
Bowditch, Arthur H., Boston, Mass.		99, 100
Carrère & Hastings, New York, N. Y.		2–6
Chambers, Walter B., New York, N. Y.		189
Chapman, Cecil (deceased)	31	
Chapman & McGiffin, Toronto, Can.	32	
Chatten & Hammond, Chicago, Ill.	13, 14	
Derby & Robinson, Boston, Mass.		80, 135, 136
Duhring, Okie & Ziegler, Philadelphia, Pa.		7–16
Farmer, Henry E., London, Eng.		167–170
Fisher, Richard Arnold, Boston, Mass.		166
Freedlander, J. H., New York, N. Y.	1-6	
Frohman, Robb & Little, Boston, Mass.		81
Greco, Charles R., Boston, Mass.	8, 9, 67–69	
Hays & Hoadley, New York, N. Y.		37
Hopkins, Alfred, New York, N. Y.	79, 80	
Howell & Thomas, Cleveland, Ohio		135
Ittner, William B., St. Louis, Mo.	61–63	
Kahn, Albert, Detroit, Mich		41, 93
Kilham & Hopkins, Boston, Mass.		155–159
Klauder, Charles Z., Philadelphia, Pa.		183–186
Kuhn, Ernest, St. Gall, Switzerland		171–174
Litchfield, Electus D., New York, N. Y.	55–57	
Little & Brown, Boston, Mass.		134
Lowell, Guy, Boston, Mass.	73, 74	
Maginnis & Walsh, Boston, Mass.	7	
Mills, Rhines, Bellman & Nordhoff, Toledo, Ohio		43, 94, 95
Morris, Benjamin W., New York, N. Y.		2–6
Mullgardt, Louis C., San Francisco, Calif.		51–54
Parker, Stanley B., Boston, Mass.		153
Parker, Thomas & Rice, Baltimore, Md.	12	
Parsons, E. M. & Co., Boston, Mass.	70, 71	
Peabody, Wilson & Brown, New York, N. Y.	33–38	89–92
Phillips, W. Stanwood, New York, N. Y.	25–28	
Platt, Charles A., New York, N. Y.	49–54	123–130, 188
Pollard, George Mort, New York, N. Y.		189
Rankin, Kellogg & Crane, Philadelphia, Pa	39–45	
Richards, McCarty & Bulford, Columbus, Ohio	75–78	
Richardson, Barott & Richardson, Boston, Mass.		17–20
Schmidt, Garden & Martin, Richard E., Chicago, Ill	65, 66	
Schuchardt & Judell, Milwaukee, Wis.	72	
Scott, Gilbert, A.R.A., London, England		116–120
Seymour, A. D., Jr., New York, N. Y.	1–6	
Shaw, Howard, Chicago, Ill.	17–24	
Shepard, George F., Boston, Mass.		21, 22
Smith, Rea & Lovitt, Kansas City, Mo.	97	
Spencer & Powers, Chicago, Ill.	15, 16	
Sperry, Joseph Evans, Baltimore, Md.	10, 11	
Study & Farrar, St. Louis, Mo.	29, 30, 64	
Tallmadge & Watson, Chicago, Ill.	48	
Thomas, Andrew J., New York, N. Y.	46, 47	29, 30
Vaughan, Henry (deceased)	58–60	121, 122
Waggaman, Clarke (deceased)		75

COURTESY OF FOSTER BROS., BOSTON

MT. VERNON STREET, BOSTON, MASS.
From the lithograph by A. H. Hepburn

The
ARCHITECTURAL
FORUM

VOLUME XXXIII JULY 1920 NUMBER 1

The Cunard Building, New York

AN EXAMPLE OF THE VALUE OF LENGTHY STUDY IN SOLVING AN ARCHITECTURAL PROBLEM. NOTES ON THE DEVELOPMENT OF THE PLAN

By B. W. MORRIS, ARCHITECT

THE various procedures in connection with this building, unlike the great ships owned by the same company, move slowly. The making of quantities of preliminary studies of plans and judging their commercial possibilities were matters of many months, long drawn out, and frequently laid aside owing to the heavy demands on the time of Sir Alfred Booth, Sir Ashley Sparks and their colleagues, in transporting troops and munitions in 1917 and 1918; in fact, it was not until the end of June, 1919, that preliminary studies ceased and the order was given "full speed ahead" on working drawings, specifications and contracts.

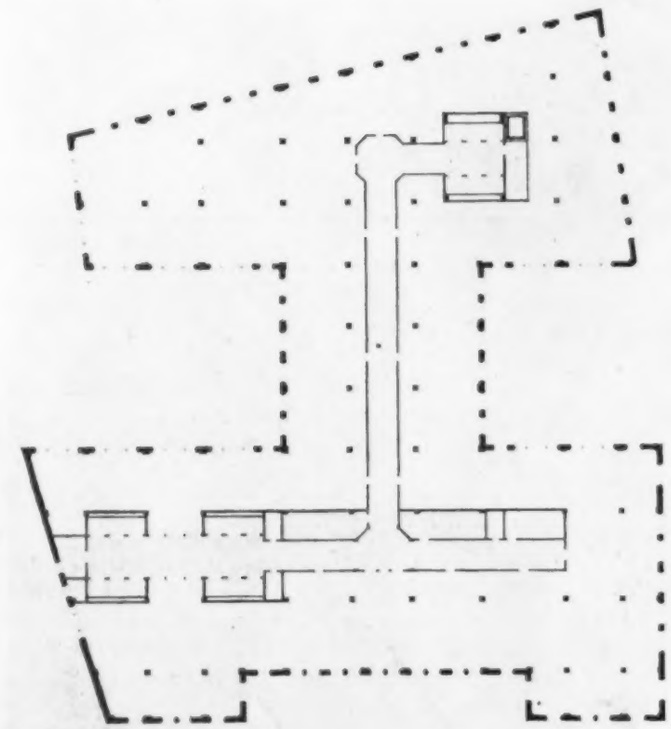
Seldom has a single operation in building construction involved greater complications of size, unknowable costs, irregularity of plot, untoward conditions of foundations, plus a tortuous, curving, steeply sloping subway, cutting through the property and adding to the general interest of the problem.

There was a very early indication on the part of the owners represented by their officials in the Twenty-five Broadway Corporation, that they meant to secure a thoroughly studied result, and having secured their builders, Todd, Irons & Robertson, Inc., and their architect, B. W. Morris, with Carrère & Hastings as consultants, they have consistently shown a spirit of co-operation and confidence, which is indicative of the modern method of attack upon a large building operation. Indeed, it is the writer's experience that the best possible results are secured when the builder, experienced, competent and honest, is appointed at the same time as the architect.

The exhibition of all the various schemes for the plan which were considered would prove tiresome even to professional readers, and certain schemes indicating the progress only are illustrated in this article. Irregularity of the streets in the portion of the city where the building is located caused some complications in conditions of light and air. A dumb-bell plan was finally arrived at for the following reasons: It was possible to provide a large open court to the southwest, admitting light and air to a large section of the building, providing warmth and cheerfulness in winter and cool breezes in summer. This scheme of plan also provided a maximum of frontage on Broadway and in that portion of the building facing Greenwich street which overlooks the North River. It also massed a considerable rentable area in the northwesterly corner of the building opposite the unusually favorable light conditions afforded by the confluence of Trinity place, Greenwich street and Morris street. Thus were the renting requirements in the upper portion of the building best taken care of, while at the same time it was possible by splaying the interior angles of the open court walls to introduce what have been termed four luminary squares, the lighting effect of which is most beneficial to the Great Hall of the Cunard Company.

This room consists of a central octagon 70 feet in diameter and 65 feet in height, with great rectangles on either side of the octagon which swell out into monumental niches recalling the Baths of Caracalla. As a result of the luminary squares supplementing the light of three great arched windows, the Great Hall will be amply lighted for the transaction of business and give full opportunity for the enjoyment of the unusual decorations which are being provided by the owners.

In the upper portion of the building the floors are being rented generally singly or in pairs to individual tenants, and by the arrangement of elevators and other essential features of service almost the entire perimeter of the building is uninterruptedly subject to exterior light and air, there being no closed courts or obstructing walls on entire property. Below the setbacks which are



The Typical Office Floor Plan of the First Study Showing the Development of the Great Light Courts

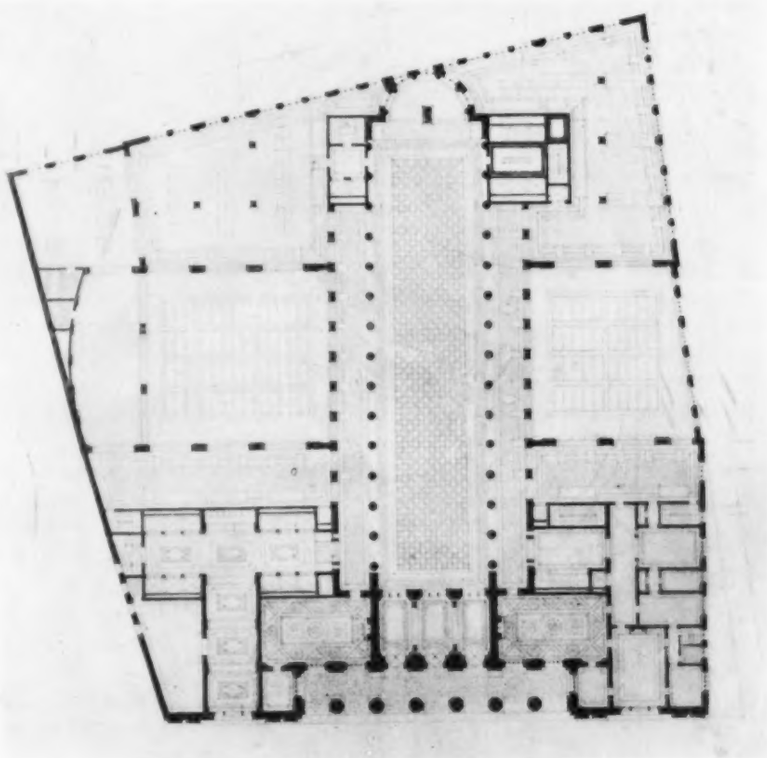
required by the zoning law, the well lighted working areas are about 63 per cent of the lot area, which is 48,400 square feet.

A treatment of the façade which would indicate the occupancy and prestige of the Cunard Steamship Company and at the same time provide ample and obvious means of access to the office building proper was obligatory. In accomplishing this the restrictions of the zoning law, which at first appeared to be obstructive in nature rather than helpful, were actually found to be the reverse.

The central mass of the building above the fifth floor has been recessed about 7 feet back of the building line, thereby making it possible to carry its sheer height in an uninterrupted vertical plane several stories higher than the end pavilions which flank it and rise on either side to the limit fixed by the zoning law.

The Broadway entrance to the office building thus becomes the dominant feature of one of these flanking pylons, and the entrance to an important bank the corresponding feature of the other pylon, while the three great central arches with an inscription on the band course over them and sculptural attributes over the colonnade at the fifth story indicate the entrance to the Cunard space and the Great Hall directly behind the entrance vestibule.

In the planning and erection of this building a double check exists on practically every item, and this is frequently trebled and quadrupled before the execution of the work, and it is well that it should be so, since it was not child's play in the field to dig 25 feet across a downtown alley far below the foundations of a sixteen story building, and carry it on piles and at the same time maintain the Broadway subway across the front of the building, with its steel trains thundering on a concrete mattress held in place on a quick-



An Early Study for the First Floor Plan Showing the Original Basilica Type of Central Space

An early study for the exterior in which the importance of the Cunard offices was marked by a Corinthian colonnade. This was abandoned because of its obstruction to light.

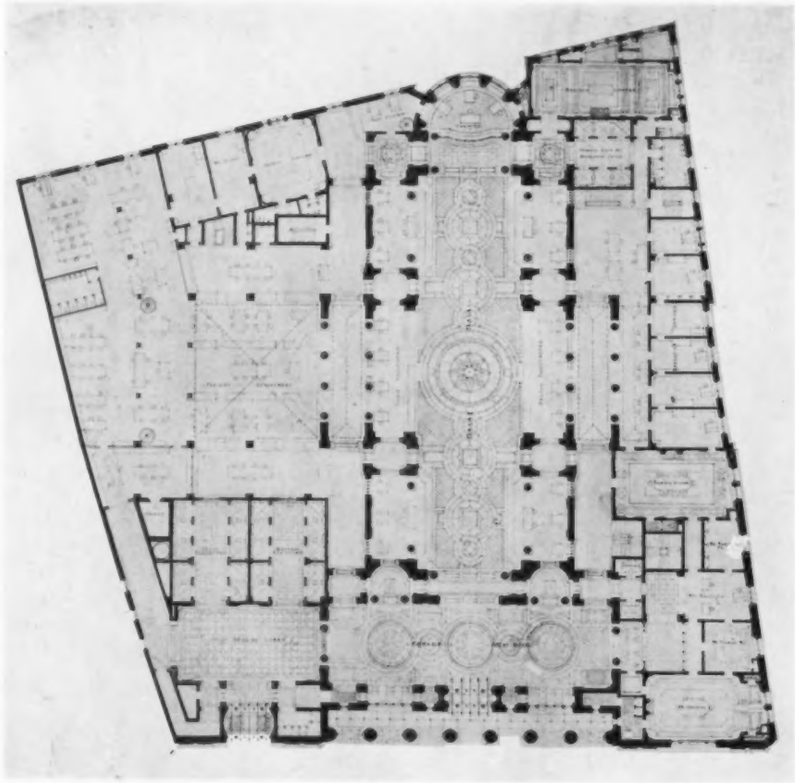
A second study with pilaster treatment and an immense beacon light crowning the building which would be easily seen from any point in New York Harbor.

Studies for Cunard Steamship Company Building, New York, N. Y.
B. W. Morris, Architect; Carrère & Hastings, Consulting Architects

sand bed, far above the bottom of our excavation. Carrying the sixteen story Bowling Green Building on the lot line was comparatively simple, but even this did not admit of many liberties.

The subway traversing the plot was designed to support twenty-six story buildings of various shapes and sizes, determined by the hazard of lot lines of ancient ownership, but the assemblage of these properties into one parcel naturally obliterated the carefully selected points of load deliveries. Then a big and expensive decision (but cheap in the end) was arrived at. We could not ascertain under what conditions and inspection the subway steel was manufactured and fabricated, and as it was largely bedded in concrete, its exact location even could not be verified. To build directly on it meant a cordial invitation to the telephoning of subway grind and roar — so the two sides of the subway have been trenched through rock, solid or otherwise, to a sure foundation below track levels, on which rows of braced columns are set carrying some of the heaviest girders yet seen in New York. These, in turn, carry concentrated column loads, spaced as the plan requires, all clear of the subway steel construction and giving the fullest opportunity for sound insulation.

The building is twenty-three stories in height, contains twenty-eight passenger elevators for general service, five private passenger elevators and three freight cars. The passenger elevators serve



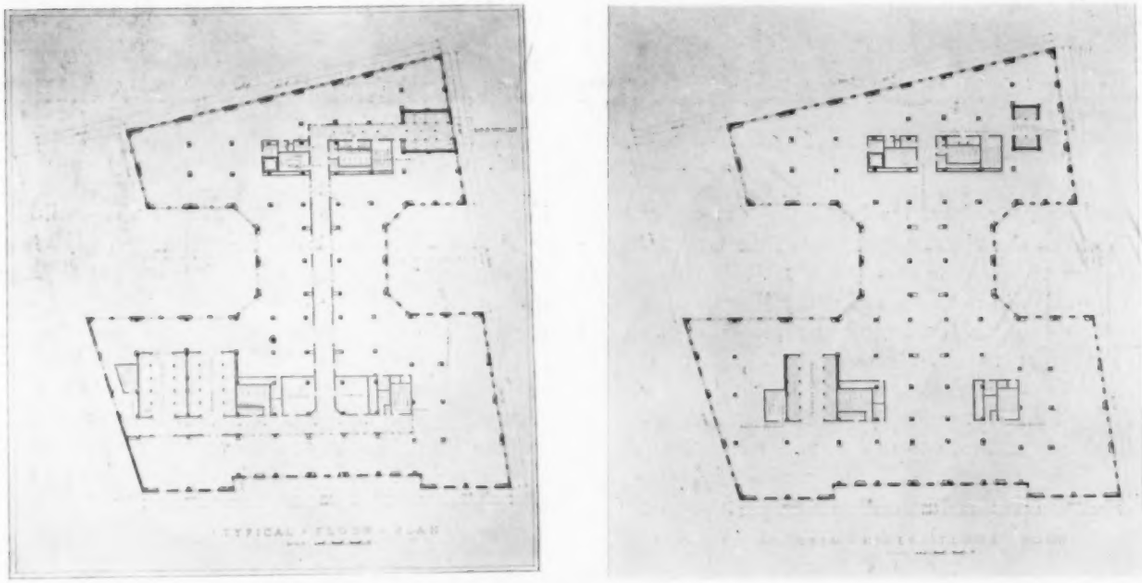
An Interesting Scheme for the First Floor Showing the Adoption of the Three-Bay Treatment for the Great Hall, and the Final Elevator Scheme

less than 19,000 square feet each, and owing to the size of the floors are separated into two main systems, the principal system being of course near Broadway.

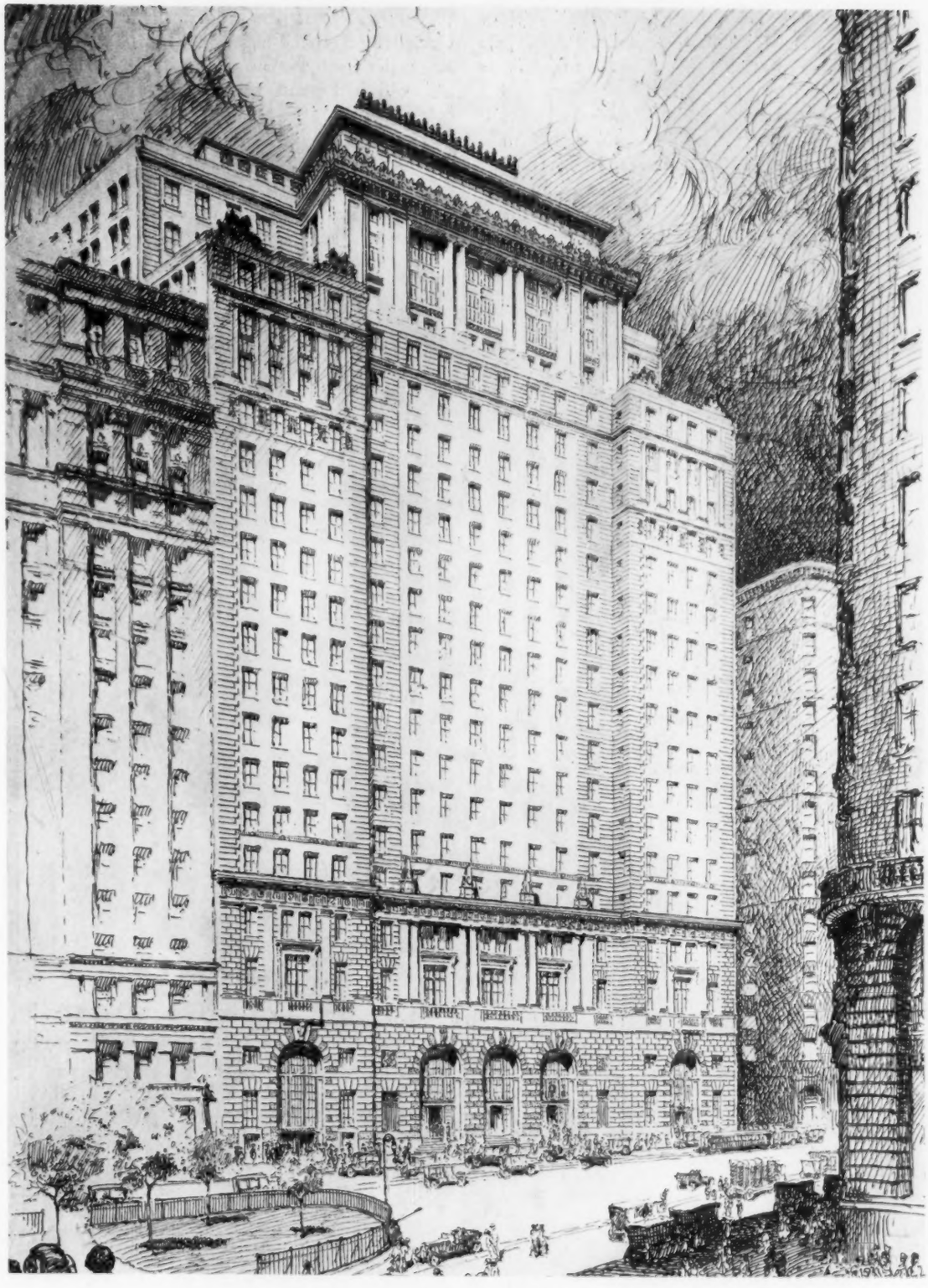
As the building progressed certain changes have been found necessary to accord with the demands of tenants. Thus the final plan of the building, while the same in its general scheme as shown in the illustration on page 6, has provision for a banking room on the right of the ground floor where working space for the Cunard Company is indicated. The colonnade has also been omitted and an arched treatment adopted in order to afford the maximum light in the Cunard offices on the second floor.

At this writing the steel is only four floors high, but the renting of the building on long term lease is practically completed, all important contracts let, and largely due to the builder's foresight and ability, and in spite of a rising market, the greatest in the history of the building trades, costs are still within "the budget." This enables the owners to lease at rates well below those current in New York.

One of the greatest pleasures in connection with this work has been the opportunity to engage the services of some of America's best artists in the



These Plans Show the Typical Office Floors of the Final Scheme Above and Below the Last Floor Served by Local Elevators. The Position and Size of the Courts and the Disposition of Elevators Make Practically Every Office an Outside One



THE FINAL SCHEME FOR THE BROADWAY ELEVATION

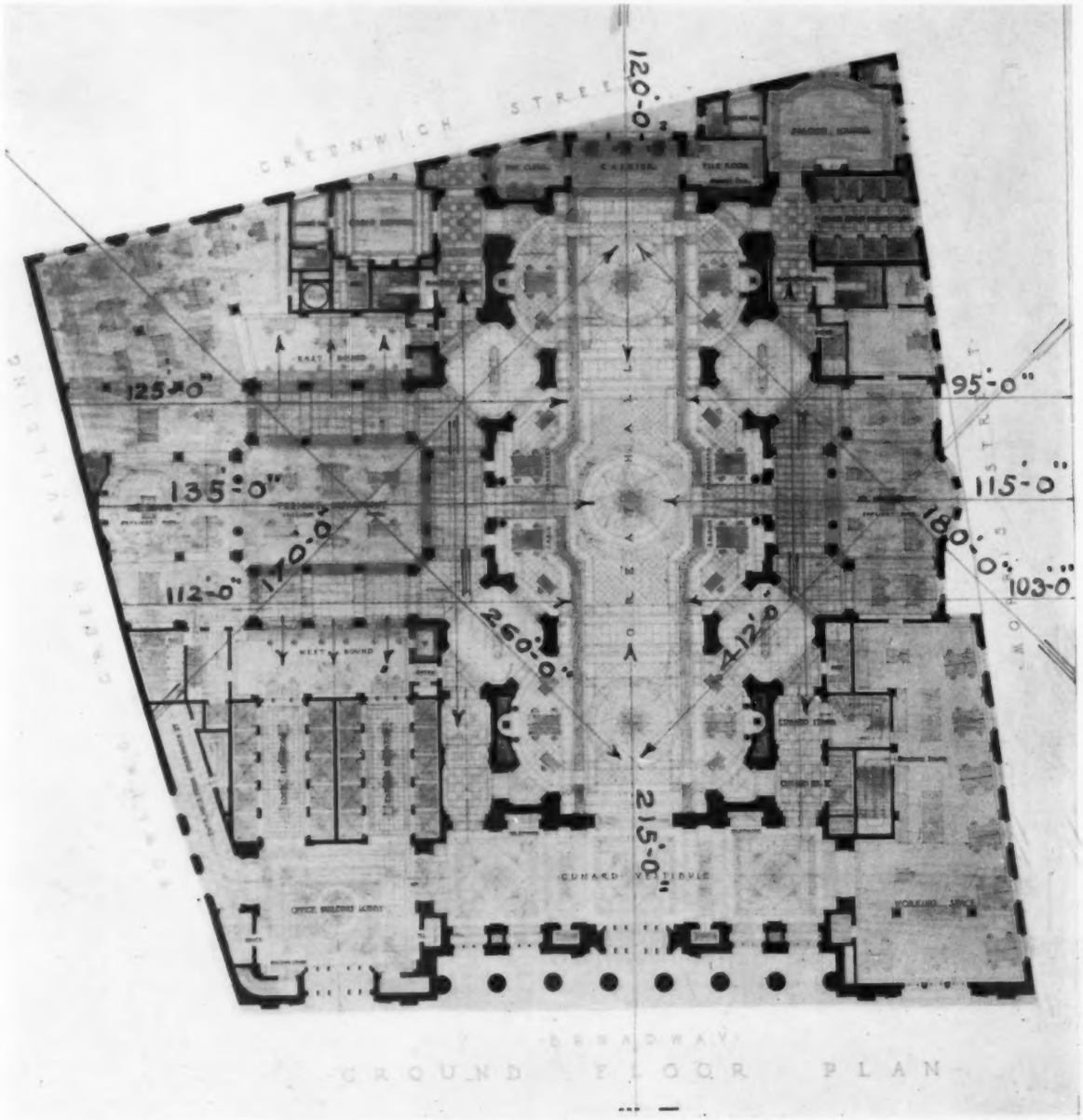
In this design the monumental character is achieved without sacrifice of any natural lighting facilities. The respective functions of the building are clearly indicated by the entrance treatment—the left bay admitting to the office elevators, the right to the bank, and the center, the Cunard offices

CUNARD STEAMSHIP COMPANY BUILDING, NEW YORK, N. Y.

B. W. MORRIS, ARCHITECT; CARRÈRE & HASTINGS, CONSULTING ARCHITECTS

embellishment of the Great Hall, the spacious apartment on the first floor, destined for the sale of saloon and cabin tickets for passage to all parts of the world. Barry Faulkner will be represented by four great wall maps ; Ezra Winter by the ceiling decoration, reminiscent in parts of the Villa Madama with the added opportunity of portraying four voyages of discovery, — those of Columbus, Leif Ericson, Cabot and Drake. On the floor, under the central dome, a compass in colored marbles will point to the true north and will be encircled by a 4-foot ring in bronze, decorated in low relief from the designs of John Gregory, who also will contribute two additional low reliefs in other parts of the floor. The remainder of the room is simple but big in scale and well lighted.

It is planned that in May, 1921, those who are interested may see in place the beautiful designs these gentlemen are now at work upon, if this be not one of those schemes which "gang aft a-gley."



The Final Scheme for the Principal Elements of the First Floor Plan Indicating the Monumental Treatment of the Great Hall and Showing the Sources of Natural Light that Will Illuminate It. The Figures Give the Distance to the Point of Light Obstruction

Modern Cotswold at St. Martins, Pa.

A GROUP OF SUBURBAN HOUSES BY DUHRING, OKIE & ZIEGLER, ARCHITECTS

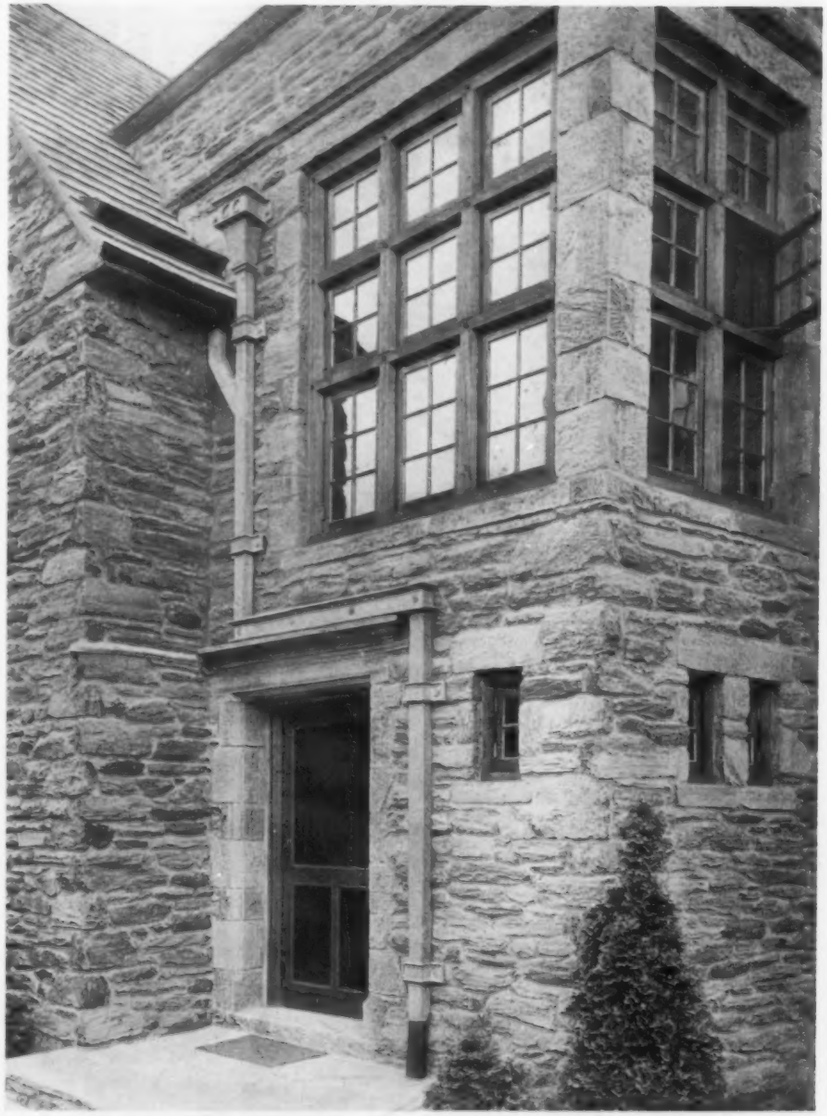
By HAROLD DONALDSON EBERLEIN

THE three Cotswold houses planned by Messrs. Duhring, Okie & Ziegler, and built under their direction at St. Martins, were cast in what might be called a "Cotswold mould" for several reasons. The locality provided abundant material, easily quarried, which seemed to be particularly adapted for building walls of houses of this type; in the neighborhood there were already such a number of houses built in this style that its architectural character seemed to be very definitely established and, finally, this particular manner of building was especially favored by the owner of the property, who had already had a considerable part in the development or upbuilding of the neighborhood, and it was also favored by the architects, much of whose most successful and interesting work has been of the Cotswold cottage type.

Entrance Side of Lower House

All of these reasons for the choice of this particular style of building are entirely legitimate and justifiable. To make use of such materials as are near at hand and to employ them effectively in a manner which their nature sug-

Detail of Gables and Stair Hall Bay, Lower House (No. 1) on Navahoe Street



ENTRANCE DOORWAY AND STAIR WINDOW

CENTRAL FEATURE OF GARDEN SIDE

LOWER HOUSE (No. 1), NAVAHOE STREET, ST. MARTINS, PA. DUHRING, OKIE & ZIEGLER, ARCHITECTS

Living Room Fireplace in Lower House

Staircase in Lower House

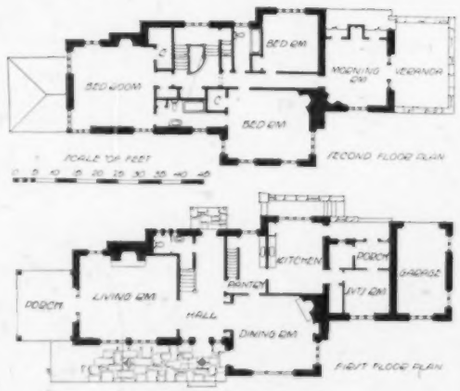
gests is but the part of economy and common sense; such has been the custom of builders since the constructing of houses first began. It is surely to be commended that sufficient consideration be paid to the character of the buildings already existing near by, that new structures be planned in such wise that their appearance might help to preserve, unimpaired, the architectural consistency of the locality. To follow one's bent in the choice of an architectural style, and to adopt it because it gives an added pleasure to the work of building

Floor Plans and Garden Side of Lower House on Navahoe Street

Entrance Side of Middle House (No. 2) on Navahoe Street

and also because it will continue to gratify when the structure is completed, is surely permissible as long as the physical requirements are fully satisfied and due heed has been paid to the surrounding conditions.

The pictures will give an excellent idea of the appearance of these three houses which add greatly to the attractiveness of a suburb which ranks well among the most beautiful and distinctive in America, the result, be it noted, of consistency in designing and planning many of the buildings so that they are in general agreement. Many of the residences at St. Martins are possessed of grounds of only a very small area, but considerable care has been devoted to dividing the property into attractively laid out building plots, to the arrangement of houses upon individual plots and also to the very tasteful development of the plots themselves, and the result of all this thought and effort is apparent in the appearance of the suburb as a whole.



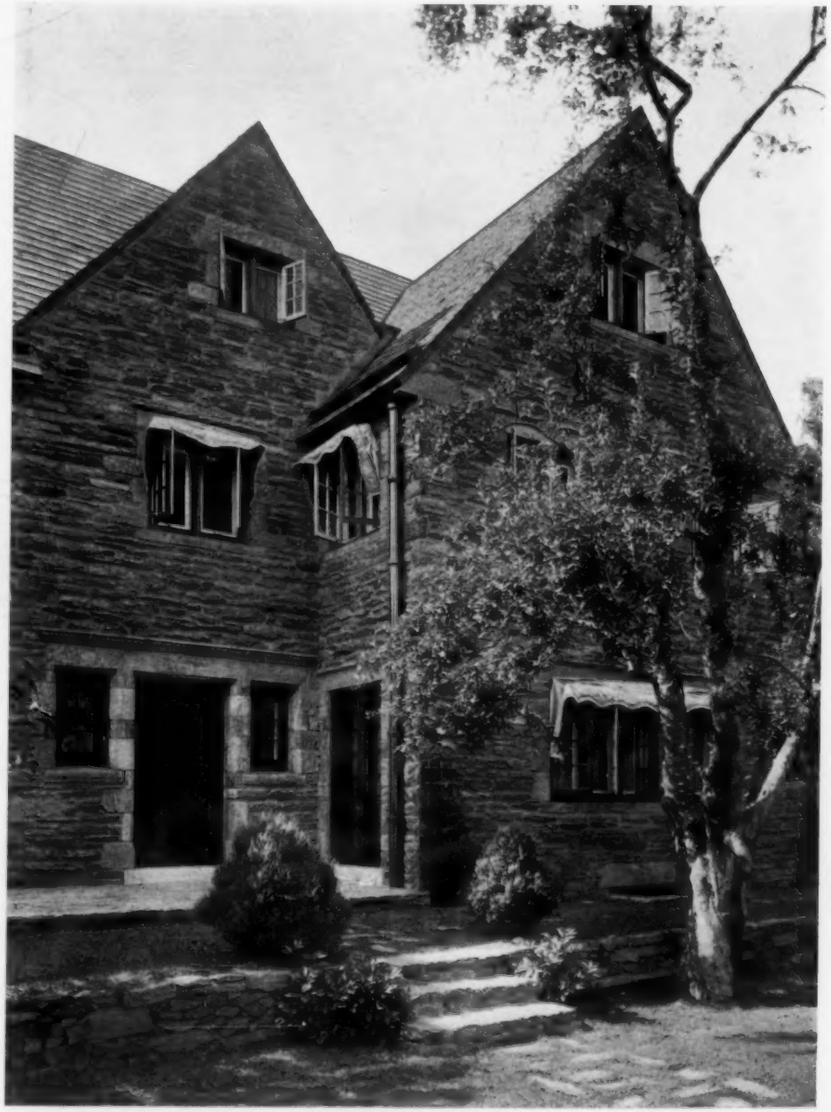
Floor Plans of Middle House

For the wall material of the group of houses under discussion, the native gray stone of Chestnut Hill has been used. Such simple cut stone embellishment as has been attempted has been wrought out in the same material which has well demonstrated its fitness for use in the execution of straightforward and vigorously modeled details. In such instances as the balusters and the semi-circular tympanum over the entrance of No. 1 or the number tablet above the door of No. 3 it is encouraging to find a real renewal of the old time spirit of craftsmanship that took without hesitation the materials at hand and, with their nature and limitations well in mind, wrought therein a suitable type of ornament. The same willingness to frankly accept the characteristics of a material and the same happy faculty of obtaining excellent results is seen in the mantels of No. 3.

The exteriors of all three houses present an appearance of frank and engaging simplicity which has been handled to create a very picturesque grouping of masses of masonry. To the richness of stone walls there is added the texture of slates upon the roofs and fortunate use has been made of casements set within the deep reveals of numerous windows.

Advantage has been taken, where differences of grade exist, to use terraces either flagged with slate or stone or else merely held in place by stone retaining walls and planted with grass. Where a house possesses both a veranda and a terrace they

VIEW ALONG TERRACE



DETAIL OF SOUTH FRONT

MIDDLE HOUSE (No. 2) ON NAVAHOE STREET, ST. MARTINS, PA. DUHRING, OKIE & ZIEGLER, ARCHITECTS

LIVING ROOM TOWARD THE PORCH

DINING ROOM DETAIL

MIDDLE HOUSE ON NAVAHOE STREET, ST. MARTINS, PA. DUHRING, OKIE & ZIEGLER, ARCHITECTS

are placed upon the same level, and both terrace and veranda are floored or paved with the same material with excellent results.

It is one of the fundamental principles of good taste in architecture, and particularly in domestic architecture, that the exterior of a house should give at least a hint or a suggestion of what the interior may prove to be. An architect may well be so imbued with the spirit of the mode in which he is working that in the exercise of his liberty of choice as to interpretation he will preserve at least some measure of coherence between the appearances of exterior and interior and will not contrive a somewhat rugged Cotswold structure to shelter a delicate Adam interior, replete with every detail of attenuated refinement. Nothing could be more admirable in itself, or amid a proper setting, than a clever and scholarly use of the Adam manner of decoration, but in suburban homes such as these, interior adornment of this nature would have no element of line or scale in common with the exterior, no point of contact to serve as a base upon which they may be welded into some semblance of congruity. This reminds one of Ruskin's saying, that nothing is beautiful which is not suitable.

This disposition, therefore, to bring about a measurable accord between outside and inside, is an especially commendable step when one recalls the extent to which the Cotswold mode has sometimes suffered in America from unintelligent interpretation. Small accessory touches, such as the simply decorated leaden downpipes of No. 1, add an appreciable interest in the way of minor details that might more often be heeded with advantage.

Floor diagrams of these various houses show plans which carry out the simple and direct treatment which has been already indicated by the exteriors of the houses. Rooms are few and of generous size rather than many and small. The woodwork is exceedingly simple, sometimes stained and sometimes painted white. Much use has been made of native stone for hearths and for the floors of vestibules and verandas.

Particularly in houses Nos. 1 and 2 the architects have felt under no obligation to adhere to the Cotswold tradition of long and relatively narrow masses of building, which means a structure

Garden Side, Upper House (No. 3) on Navahoe Street

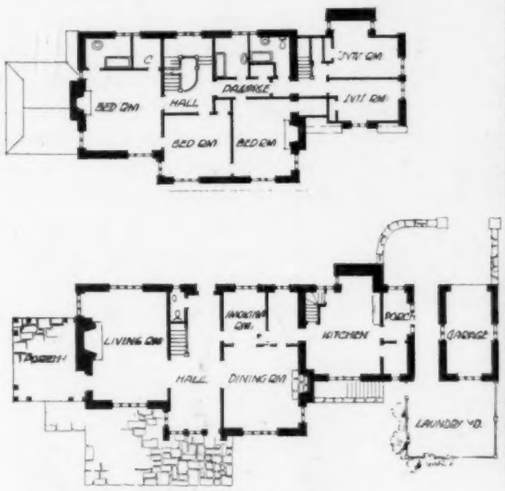
DETAIL OF NORTH FRONT AND ENTRANCE

DETAIL OF SOUTH FRONT GABLE

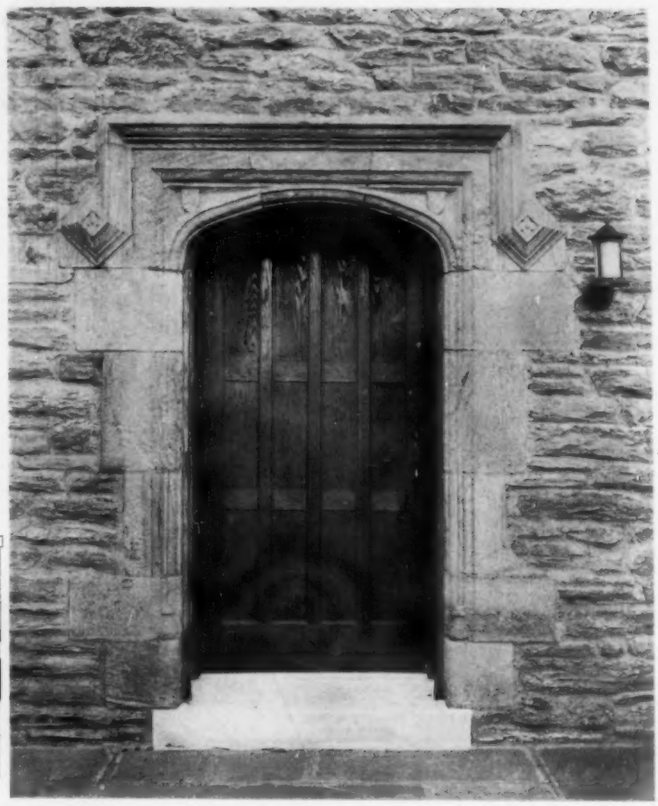
UPPER HOUSE (No. 3) ON NAVAHOE STREET, ST. MARTINS, PA. DUHRING, OKIE & ZIEGLER, ARCHITECTS

of but one room in depth. On the contrary, these houses resemble certain old Cotswold structures, exceptions to the general type, which have been much added to and made more compact by additions.

Several of these houses at St. Martins are provided with garages, and their planning and arrangement seem to call for particular notice. Placed as they



Floor Plans of Upper House



Entrance Doorway of Upper House

View from the Street of Upper House (No. 3)

Living Room Fireplace

the tall windows which light the hall is such that they are included as a part of the architectural treatment of the door.

Other fortunate details of design are in connection with the chimneys, several of which have horizontal courses of cut stone near their tops which give to the stonework an added note of accent. Quoins set at the corners of the larger chimneys, where they appear to strengthen the rubble masonry, confer another note of distinction. The exteriors of these houses gain greatly in attractiveness by the taste with which minor or accessory details are supplied.

are close to the residences, if not actually joined to them, the grouping gives the double advantage of increasing the picturesque and rambling bulk of the structures and making possible considerable economy in the way of heating and, doubtless, adding much in the way of convenience. Where these garages are not actually joined to the main structures, they are so connected with them by stone walls or wooden trellises that the effect of structural unity is secured.

In these three residences at St. Martins there is an unusually happy arrangement of the fenestration so that in many instances door and window openings are grouped together. Particularly in the case of a stone building greater breadth and dignity are obtained by this treatment than by planning many separate openings scattered over wide expanses of exterior walls which have the appearance of weakening the masonry. The garden side of the house on page 13 gains by the careful handling of windows and doors. The grouping of

Garden in Keeping with Spirit of Houses

Interior Decoration

A HOUSE DESIGNED IN THE ITALIAN STYLE

RICHARDSON, BAROTT & RICHARDSON, ARCHITECTS

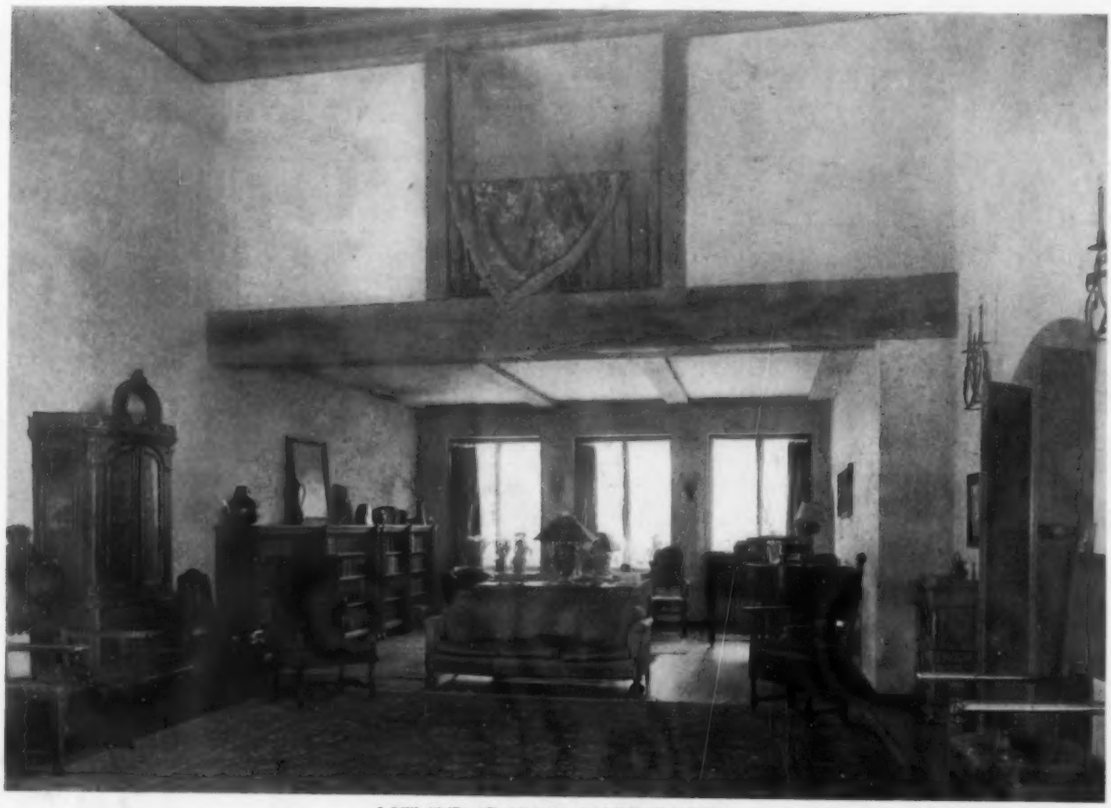
THE present popularity of Italian styles in decoration is the result of several causes. The tendency, in domestic architecture, is toward a few large rooms rather than a greater number of rooms small in size. Large rooms are apt to involve broad wall spaces and large door and window openings and for decoration, under these conditions, the various styles of Italy are well adapted. Then, too, this is the day of simplicity in decoration and the Italian styles adapt well whether the simplicity be somewhat austere or possibly more fully developed where ornament, though adequately used, is employed with care and due restraint.

With the increasing vogue of the Italian has come a better understanding of its use and its widening popularity is due largely to the success with which it is being handled by architects and interior decorators.

A very interesting use of decoration of this nature is found in the interiors of the residence at 21 Beaver place, Boston, the work of Messrs. Richardson, Barott & Richardson. A façade of brick and stone gives a certain intimation of what the interior will be, for it is a very frank and simple exterior, such as might be found in almost any of the highways or byways of Venice.

From the street the main doorway, in which are set square grilles of antique Italian wrought iron, opens through a small vestibule into an entrance

View of Dining Room



LOW END OF GREAT DRAWING ROOM

DETAIL OF LIBRARY

RICHARDSON, BAROTT & RICHARDSON, ARCHITECTS

Entrance Hall from Vestibule Door

hall, not large in area but low ceiled which increases its apparent size. Plain stone colored cement is used for the floors and the walls are of rough plaster which has been painted first an azure blue and then a pinkish buff which has flecked off showing the blue beneath. A grille of old wrought iron conceals a heating radiator set in a shallow alcove near the ceiling, and a corner fireplace with elevated hearth, old andirons and Italian hood heightens the quaint effect given by the use of many valuable details of antique furnishings.

From the entrance hall a winding stone stairway set in the thick walls leads to the main floor where, filling one entire end of the house, is a lofty drawing room where walls of a pale buff rough plaster form an effective background for old tapestries, fabrics and portraits and treasures in the way of Spanish and Italian furniture, old brasses and wrought iron. The ceiling of this great drawing room is of walnut, made in a coffered form with carving partially gilded and polychromed. An added quality of picturesqueness is given to this room by the different heights at which the ceilings are placed. The greater part of the room is two stories in height but at one end the height is but that of one story. In part of the wall space thus formed is a small balcony across which is placed an antique iron grille. A library which opens from the drawing room is walled with chestnut, very simply stained and waxed, and an added distinction is given to the room by the use of an antique Italian mantel of stone.

What might be considered by many to be the most interesting room of the house is the dining room which is floored with square tiles of a greenish blue covered with a very low or dull glaze. Walls and ceiling are of rough plaster with which has been mixed a little dry color which has tinted the plaster to a rich and rather warm tan which offers a striking setting for tables, chairs and buffet of Italian walnut and lighting fitments, extremely simple, of iron.

The unusual success with which these very interesting interiors are arranged is largely due to the skill which has directed the use of very simple materials and the wise restraint which has pre-

Drawing Room Doorway Looking into Stair Hall

vented the use of ornament and accessories in excess. Some one has very aptly said that the essence of success in interior decoration, in fact, success in any department of architecture or the kindred arts, consists in knowing when to stop.

There are countless instances where the use of the most valuable accessories has produced an interior of hopeless and overcrowded confusion instead of an appearance of rich simplicity and tasteful elegance which might easily have been secured with such material to work with. Restraint and careful choice of objects, together with their arrangement with thought and discrimination, are sure to bring their due and rich reward.

Detail of Great Drawing Room

A Successful Alteration for a Restaurant

GEORGE F. SHEPARD, ARCHITECT

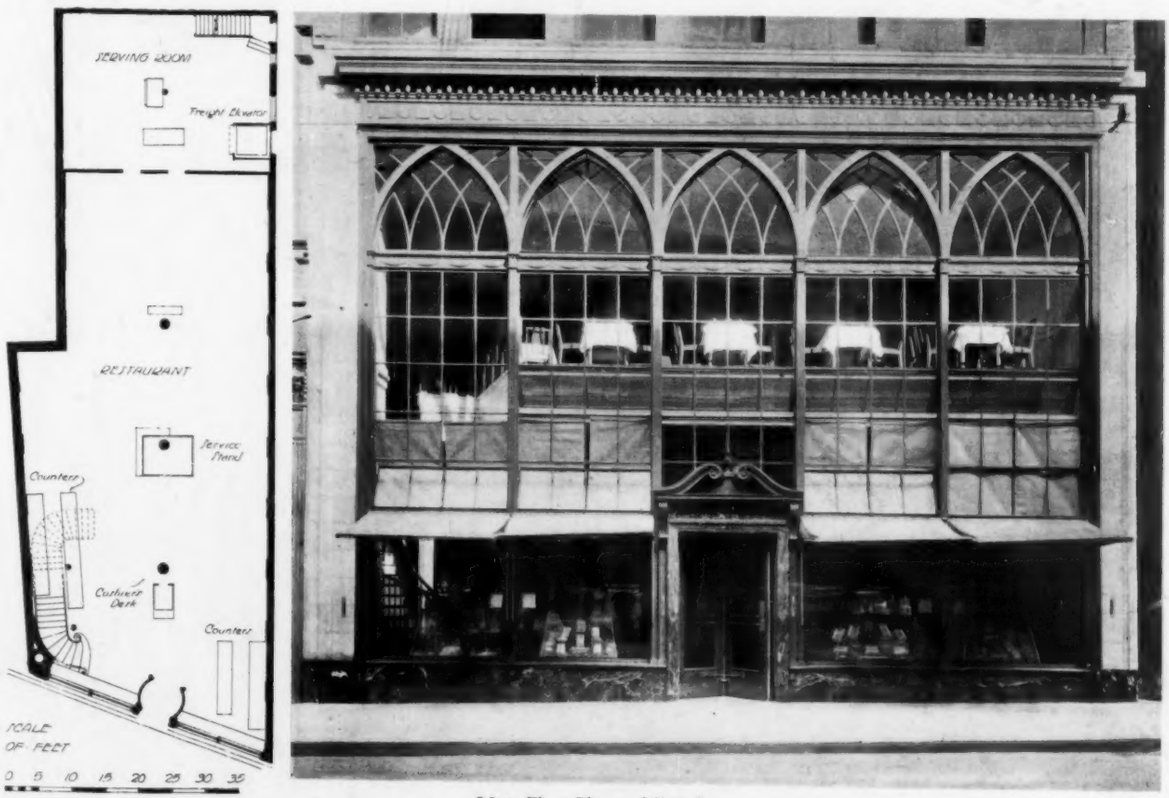
THE Wedgwood restaurant at 531 Washington street, Boston, is of interest in showing the possibilities in altering old commercial buildings. In its planning and decoration unusual taste and ingenuity have been used.

The premises include the first and second floors of a building about 50 feet in width. The entire front of the restaurant has been planned as a single unit, very well carried out in a tasteful combination of marble, terra cotta and metal which involves the use of considerable plate glass, not arranged in vast expanses but cut into smaller divisions in a very simple and graceful design which goes far toward establishing the character or keynote of the restaurant as a whole.

Entrance doors from Washington street open into the main or ground floor restaurant and it is seen at once that the exterior, planned in a modification of the Adam style, indicates the spirit in which the entire restaurant is arranged. Above a tall paneled wainscot which extends entirely around the floor are walls of Caen stone divided into a series of slightly recessed and regularly spaced arches. These semicircular spaces or lunettes are filled with large plate mirrors over which are set richly wrought grilles toned to a dull gold, the refined Adam pattern of which gives a note of great distinction to the entire interior.

Between these lunettes, as well as in certain other wall spaces demanded by the working out of the plan of decoration, are placed modeled oval plaques which are painted in soft colors after the manner of a Wedgwood pâte-sur-pâte. The ceiling, supported upon tall fluted columns, is divided by heavy transverse beams between which are slightly curved panels adorned with relief in color and from a central medallion in each panel hangs a bronze lighting fixture. The fixtures aid greatly in carrying out the spirit of the Adam style which has been consistently adhered to throughout. The floors of the building are of terrazzo marked off into squares, at the intersections of which are set tiles in a variety of colors and designs.

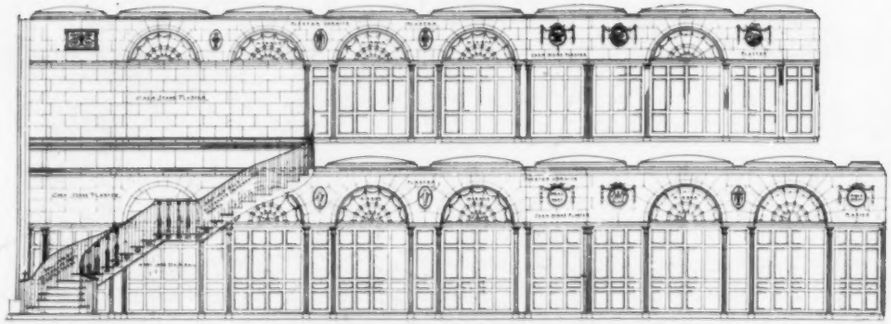
Close by the entrance from the street a main stairway, very well designed, leads to the restaurant upon the upper floor. The stairway, arranged with a graceful, sweeping curve, is of green and warm gray marble surmounted by a light iron balustrade, the occasional inserts of which are picked out in gold leaf.



Main Floor Plan and Façade

The second floor beam against the windows is faced with mirrors which avoid a break in the continuity of the fenestration

VIEW TOWARD SERVING ROOM ON MAIN FLOOR



LONGITUDINAL SECTION SHOWING LEFT WALL

STAIRWAY TO SECOND FLOOR RESTAURANT

WEDGWOOD RESTAURANT FOR THE GINTER COMPANY, BOSTON, MASS.

GEORGE F. SHEPARD, ARCHITECT

The Automobile and the Private Estate

PART IV. CURVES AND TURNS

By TYLER STEWART ROGERS

THERE are three typical road junctions to consider. The first is shown in Figs. 2 and 3. In Fig. 2 is shown a junction having curbs of very small radius. It may be seen from the dotted lines that a car must swing out into the centers of both roads, or almost across one road, in order to make the turn. This exposes the car to collision with other vehicles moving in the opposite direction, as well as blocking traffic moving in the same direction.

In Fig. 3 is shown the same junction with curbs of liberal radius. Here both cars can negotiate the turn without interference.

The second type of junction is shown in Fig. 4. In this instance the driveway meets the road at an acute angle. The curb within the acute angle in this case should never be of less radius than 18 ft., for automobiles making a sharp turn of this kind reach their minimum curve and follow it for some distance. When the angle is very acute, it is frequently desirable to fork the entrance drive around a triangular island to reduce the amount of paving otherwise necessary in the delta.

The third type of junction occurs when the two roads diverge in the form of a Y. The difficulty of the problem depends on the acuteness of the angle between the roads. When very acute, the solution generally demands a separate roadway around a triangular island, as in the second type. When the angle between the roads is broad it is merely necessary to cut back the junction sufficiently to provide a radius of not less than 18 ft.

The most difficult problem introduced by the automobile in estate design is the turn at the forecourt or in the service yard. Many costly errors have been made, due to insufficient planning ahead of construction work.

Each problem presents its own difficulties and no two cases are alike. It has occasionally been the practice to determine the final shape and size of turns by means of an automobile actually driven over the ground a number of times, the location of the wheel marks indicating the position of the road. This procedure is satisfactory when properly carried out with several types of cars but, being based on trial and with the possibility of error, is often a very unsatisfactory makeshift. To a considerable extent correct design can be determined in the drafting room, when sufficient consideration is given to the subject.

There are four general classes of turnarounds: (*a*) the simple loop serving only as a means of reversing direction; (*b*) turns having a stopping place opposite the approach; (*c*) turns having a stopping place at one side of the curve, parallel to the direction of approach; and (*d*) turns having more than one approach. Each class has many variations, but with certain similar requirements.

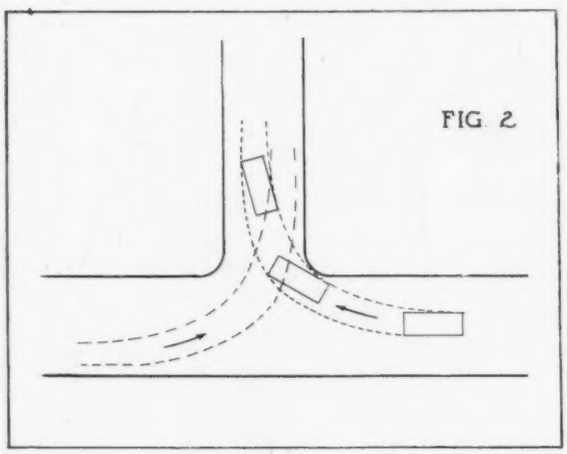


FIG. 2

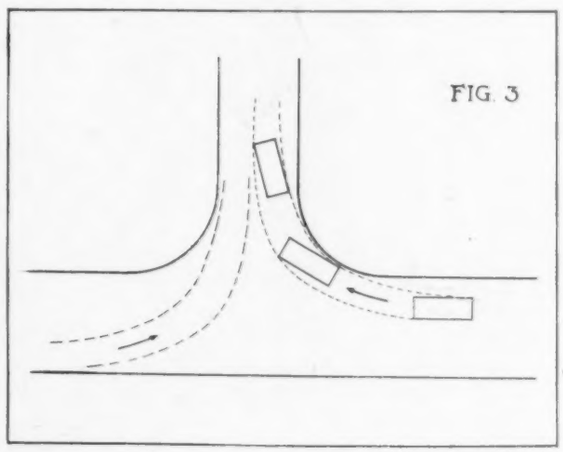


FIG. 3

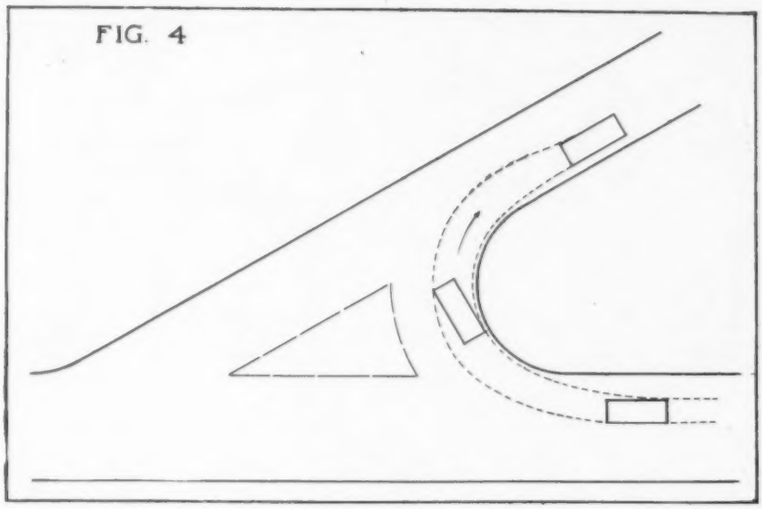


FIG. 4

minimum outside turning radius of the car, and the radius of the head of the inner circle is equal to the turning radius of the inner rear wheel. The minimum outside radius of large passenger automobiles ranges from 23 ft. to 30 ft., and the radius of the circle described by the inner rear wheel is from 10 ft. to 18 ft. If a machine has occasion to complete the circle, it will do so at the same minimum radius as shown by the dotted lines.

An unsymmetrical loop is shown in Fig. 6. All of the reversing of direction is performed on one side at X.

The simple loop is shown in Figs. 5 and 6, which illustrate a symmetrical turn in the first instance and an unsymmetrical turn in the second. In Part I of this article, in which the movement of an automobile was discussed, it was demonstrated that in making reverse turns there must be a point of straight travel between the two different parts of the curve. This condition is met with in the turn shown at A, Fig. 5, at points X and Y. For purposes of illustration these turns are drawn to show the path of a single automobile. When the automobile is actually turning around the loop it reaches its maximum degree of curvature, hence the radius of the head of the loop is equal to the

Before discussing the second and third types of turns, both of which involve the problem of the stopping place within the curve, it should be noted that the body of an automobile is not tangent to the circumference of the curve it is describing. See Figs. 5 and 6, and Part I. Because of this fact an automobile cannot be brought up close to a curb or to a landing block without first straightening out the wheels. Hence, whenever a stopping place is introduced into a turn, it is desirable to provide a straight section approaching and leaving this point.

The second type of turn involves a stopping place at the head of the curve, when the machine

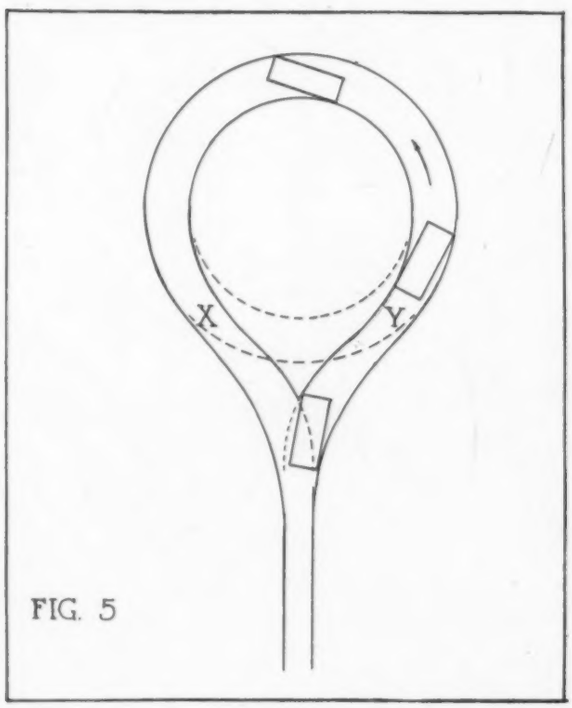


FIG. 5

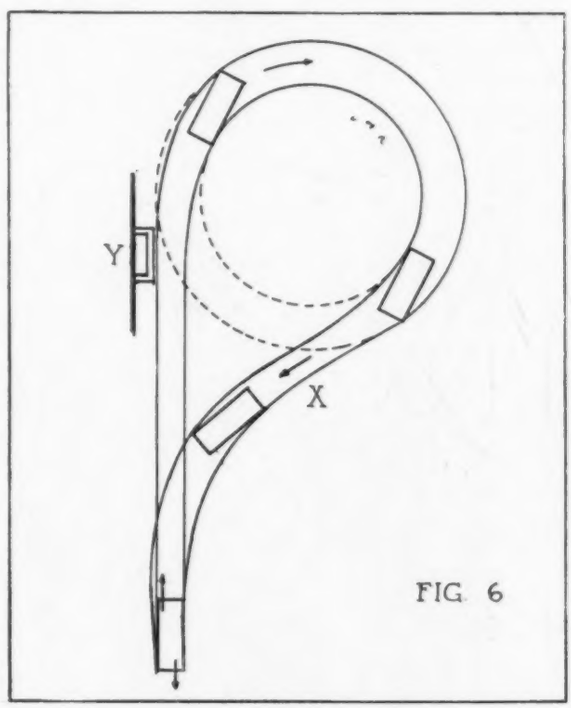


FIG. 6

is at right angles to its direction of approach. In Fig. 7 is shown a simple, formal approach. The curve is made up of two reverse curves separated by a tangent equal to one car length at the stopping point. Even this allowance does not bring close contact at the stopping place. If this curve were simply a circular arc of minimum radius, the car would not be able to stop close to the steps without backing.

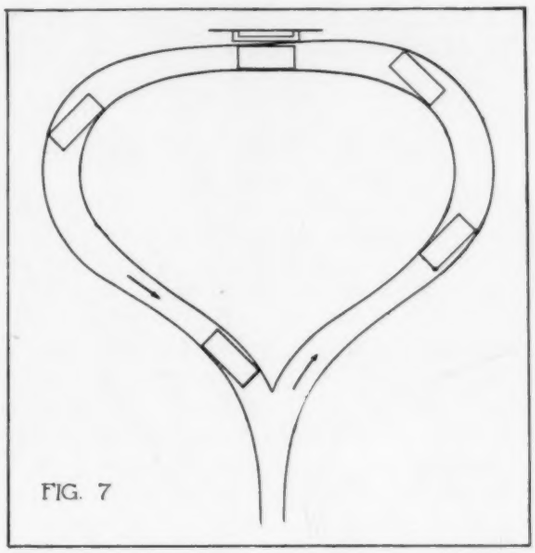


FIG. 7

It should be noted that the introduction of the tangent section not only increases the sharpness of the reverse turns at the throat of the curve but also widens and lengthens the throat as compared with Fig. 5. A case in point may illustrate the importance of this fact. A formal forecourt bounded on three sides by the residence and its two wings had a stopping point at the center of the turn. The designers built a wall around the court, making it of square shape about 75 ft. long on a side. The gateway opposite the entrance to the residence was just the width of the driveway. It was found that large cars could not negotiate this turn if they stopped at the doorway and be close to the step unless they went beyond the step and then backed. Since it was impossible to widen the court to its proper size this intolerable condition was partially remedied by increasing the length of the forecourt, placing the wall and gate some 10 or 15 ft. farther away from the residence. The same result would have been obtained by making a very wide gateway or by omitting the enclosing wall entirely and allowing proper room for the throat of the loop.

The third type of turn, having the stopping place on the side of the loop, presents similar requirements. A straight section must be introduced on one side but, except for the sake of symmetry, need not be introduced on the opposite side. Fig. 8 shows a symmetrical loop and Fig. 6 represents the unsymmetrical type, the stopping place being at point Y.

The fourth type is really a combination of the foregoing types. Having two approaches requires a loop which may be negotiated in either direction. The stopping place again varies the problem by its relative location. A typical example of this type is shown in Fig. 9.

Although many shapes are required other than those shown, all may be worked out on the basis of these four types. Consideration of the following points in each case will assist in obtaining correct design: (*a*) the elemental curve described by an automobile, (*b*) the reverse curve and its point of straight travel, (*c*) the stopping point and its straight section or tangent, (*d*) the increase in the width of the road in proportion to the sharpness of the turn, and (*e*) the minimum turning radii of automobiles. In most instances the drives on country estates can be worked out with ease if taken when the most preliminary drawings are at hand, but at the seacoast or in the mountains the most ingenious application of layouts will often be needed to overcome contour conditions.

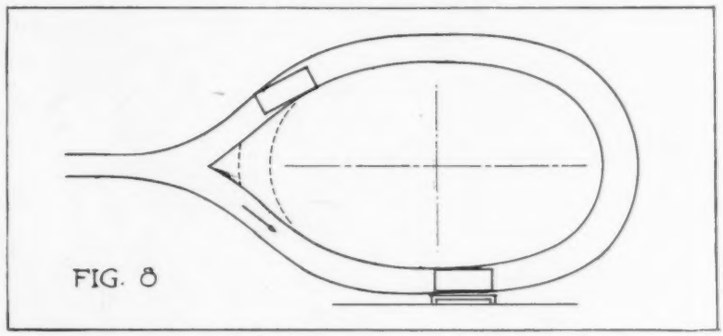


FIG. 8

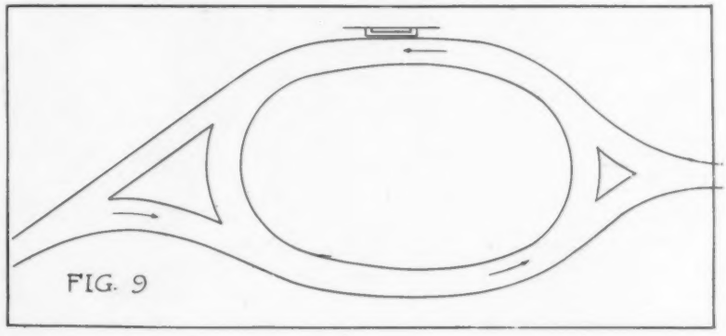


FIG. 9

Sprinkler Installation for Fire Protection

PART I

By W. D. BROWN, C.E.

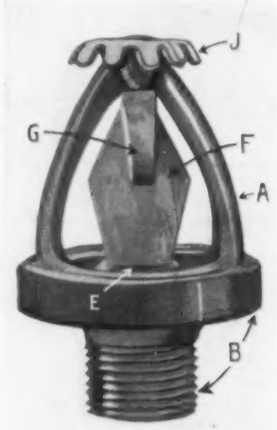
IN all congested sections of large cities there exists a potential danger of a fire spreading into adjoining buildings. A fire might start under ordinary conditions and, if not discovered in time, get beyond control of the most efficient fire department. Such fires are never controlled by the human element but are extinguished by burning themselves out.

The fact might be emphasized that when there is anything that will burn in a building, no matter how fire resisting or fireproof the building may be, it must be expected that the building will burn out internally if a fire starts; that is, a fireproof building cannot protect its combustible contents.

It is said that ninety-nine out of one hundred fires could be extinguished by a stamp of the foot or a pail of water if discovered in time. This being a fact, it can be readily understood why automatic sprinklers are by far the most important of private fire protection devices.

Automatic sprinklers might be described as mechanical watchmen, located in all portions of an equipped building, the duty of which is to extinguish any and all fires. Unlike the human watchman, automatic sprinklers cannot go to sleep on the job, they do not get excited in an emergency and are not blinded by smoke which means a waste of extinguishing agent and damage to property not affected by fire. Automatic sprinklers are always on the job and a slight rise in temperature causes them to open up, bringing down on the fire a drenching rain, before the small blaze can become a fire of larger proportions.

The human element, in case of fire, fails sixty times out of one hundred, while an automatic sprinkler, when properly installed and kept in working condition, has so effectively shown its ability to put out fires that property owners are not now as skeptical as to the value of the investment as formerly when sprinkler systems were first being installed for protection.



A — Yoke
B — Body
E — Glass Valve
F — Main Strut
G — Hook on Strut
J — Splash Plate

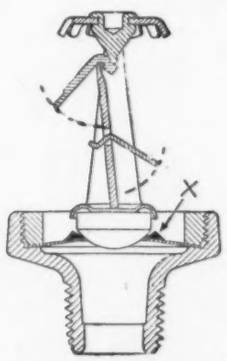
Fig. 1

Sprinklers not only prevent interruption of business by fire, which means loss of customers and loss to employees, but their use means a large saving on insurance. One remarkable case may be cited where on an investment of $12,000 for a sprinkler system $4,700 was saved annually.

In general the modern sprinkler head consists of one-half inch orifice, the lower portion connected to sprinkler pipe and "stopped" on top by a disc of some non-corrosive substance, glass, silver or porcelain now being used for this purpose. A few inches from this disc is a deflector or "splash plate." The stopper or disc is secured in place by a series of metal pieces held together by fusible solder and so arranged that they form a strut or brace between stopper and deflector.

Two sprinklers, now being used extensively, are shown. These sprinklers were chosen from the many approved sprinklers as they represent different arrangements of struts and braces. A rise in temperature causes the solder to melt; the struts or braces then spring apart and release the stopper or disc and the water escaping strikes the deflector which breaks it into a shower that effectively extinguishes the fire. (Figs. 1, 2, 3.)

The efficiency and sensitiveness of a sprinkler is illustrated by an occurrence which caused much amusement in a boys' school located in New Hampshire and equipped with automatic sprinklers. A new pupil, having heard about the workings of a sprinkler, decided that he would experiment and discover whether it was a fact that a sprinkler would actually operate in case of a fire. The time of action was chosen to be midnight and the instrument to open the sprinkler was a broom which was set on fire and held at arm's length under the sprinkler. The theory was that after the sprinkler began to operate a hasty retreat would prevent the wetting



Showing struts Springing apart as head goes into action on melting of solder

expected. The silent, mechanical watchman, always on duty, functioned perfectly. It opened up, showering a full 100 square feet with a drenching rain.

It is said that many a well laid plan will go wrong. The truth of this was clearly demonstrated to the boy, who planned to get away without a wetting. He was caught in the first burst of water, which was somewhat dirty as it had remained stagnant in the pipes for a number of years. After the sprinkler opened, a mechanically operated gong on the outside of the building clanged its warning. The boys, trained in fire drill efficiency, filed out of the building to safety. When no fire was discovered an investigation was started. The boy with a pair of white pajamas covered with dirty water was soon found and was glad to confess his part in the deed.

The ordinary or low test sprinkler, used in rooms of normal temperature, has a fusible solder which melts at approximately 160° Fahr.

For rooms which are heated to more than normal temperature a less sensitive solder is used. Sprinkler companies are required to furnish high test sprinklers which will operate at approximately 212°, 286° and 360° Fahr. The importance of getting the right fusible solder in its place can be clearly understood when it is remembered that a high test sprinkler located in a room exposed to normal temperature would require a much greater fire to "open it up." This would allow the fire to get a start and probably open up more sprinklers than necessary, causing an increased water damage.

In case a low test sprinkler were located in a room exposed to a temperature above normal, the sprinkler would fuse without the assistance of a fire and cause water damage. Good engineering requires that an actual test be made of all rooms heated to more than normal temperature to determine which test sprinkler is best suited for its needs.

For the assistance of the inspector, low test sprinklers are not painted. These are used in rooms with a temperature of 100° or less. 212° sprinklers are painted white and used in rooms where the temperature varies from 100° to 150°. 286° sprinklers are painted blue and used for a temperature between 150° and 225°. 360° sprinklers are painted red and are used for temperatures exceeding 225°.

There are places where acid or alkali fumes may corrode sprinklers; among them are plating rooms, stables, bleach rooms, tanneries, paper mills, chemical plants, glucose and starch plants, carbonizing or wool extracting works, dye and galvanizing works and certain rooms in fur dressing or cutting establishments. Moving parts of sprinklers used in such places may get stuck together or the solder may harden until it becomes crystallized and then be easily broken by water.

Various methods have been tried for preventing the corrosion of automatic sprinkler heads, the result being that several prominent sprinkler companies are using, where necessary, wax coated heads which give fair satisfaction. The wax melts at a lower temperature than the solder, so that it should not affect the sensitiveness of the sprinkling apparatus. Glass cups are used by a large sprinkler company with good results, the only disadvantage being a slowing-up action of the sprinkler head. Incrustation of sprinklers often occurs in flour and cement mills, grain elevators, saw mills, sugar refineries and other places where dust is constantly rising. The fine dust soon hardens into a crust about the sprinkler, rendering it inoperative.

In rooms where artificial heat is employed for drying purposes, such as oilcloth factories, rubber works, etc., particles of oil and varnish may settle on sprinklers and be baked there by heat, forming a hard coating which impairs the sensitiveness of the sprinklers. Wherever exposed to incrustation, sprinklers should be frequently cleaned or replaced.

Where there is any danger of the efficiency of sprinklers being impaired it is advisable to consider some sort of protection for the sprinkler

Sprinkler Intact

A — Deflector or Splash Plate
B — C — D — E — Struts or Braces
F — Fusible Solder
G — Cup or Stopper
H — Silver Disc under Cap to Prevent Corrosion
I — Part of Frame

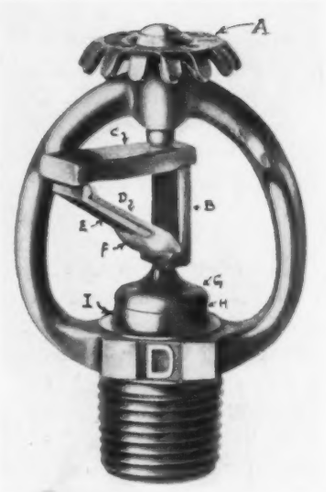


Fig. 2

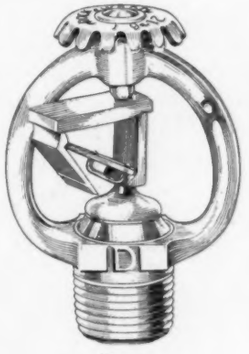


Fig. 3

Above Sprinkler Head going into action. Wire Loop normally embedded in solder prevents it from becoming dislodged except when melted

pipes. Some of the methods used are the painting of pipes and covering them with painted burlap in case of corrosion; painting pipes once a year with red lead and linseed oil or using galvanized pipe which will withstand moisture often affords protection, and graphite paint and rubber tape are used for safety in case of chemical action.

Sprinkler Water Supply

The effectiveness of a sprinkler system depends on water in sufficient volume and with proper pressure, it being understood that a sprinkler has to wet maximum areas (on floors, not ceiling) of from 80 to 100 square feet, depending upon the construction of the ceiling and the hazard of the inside of the building. One pipe supplied from a public main should give a minimum static pressure, day and night, at 25 pounds at highest line of sprinklers.

For a standard equipment, adequate water supply is absolutely necessary; if two supplies are used, one must be automatic and the other must be able to furnish heavy pressure. A public water main is usually used for one supply and in some cities streets are equipped with two pipes, one supplied from high pressure sources and one pipe supplied from low pressure stations. In this case a pipe from each main should be carried into the building, each pipe being equipped with an indicator shut-off valve and a check valve inside the building. The city water departments usually install their own types of valves in the streets. See Fig. 4.

The gate valves are used for shut-off purposes while the check valves are used to prevent the water from high service mains from backing into low service mains, and vice versa when pressure on high service mains is reduced. They are used to prevent stagnant water in sprinkler systems from flowing back into mains, if pressure should be reduced, and then being used for household purposes.

Cities and towns have various rulings relating to fire protection pipes. Some require detector meters on supply pipes, double check valves and limit the sizes of pipes. For example, in Boston the water department rulings require that not larger than 4-inch pipe be brought into a building. Should a larger pipe be necessary additional 4-inch pipes will be carried into a building, providing that they are 40 feet apart.

Fire pumps are frequently used to furnish one water supply to the sprinklers. Good engineering requires that the pump and the pump house should conform to the standard established by the National Fire Protection Association. The pump should draw from a source sufficient to enable it to deliver its full capacity for at least 60 minutes without reducing the level of the water so that the suction lift will not exceed 15 feet.

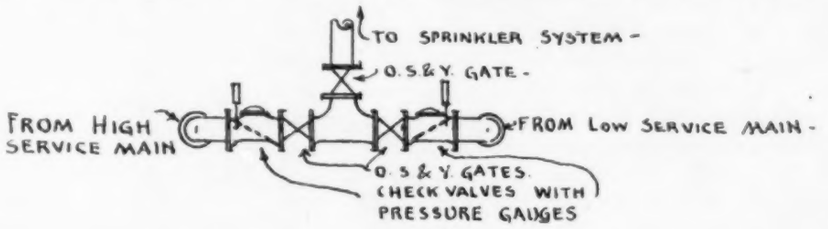


Fig. 4

If the pump supply comes from a body of water which might contain refuse or dirt, a screen or some other protective device should be used to prevent foreign matter entering suction pipes. If suction has a lift of over 15 feet it should be fitted with a foot valve. The only purpose of a foot valve is to shorten the time needed to get the action of the pump under way. A foot valve resembles a check valve, inasmuch as it holds priming water from backing into sources of supply. Gravity tanks are used as sources of water supply where pressure in public mains is low. Tanks are constructed of wood, steel or concrete and are elevated on roofs or trestles so as to give good gravity head where water is to be supplied.

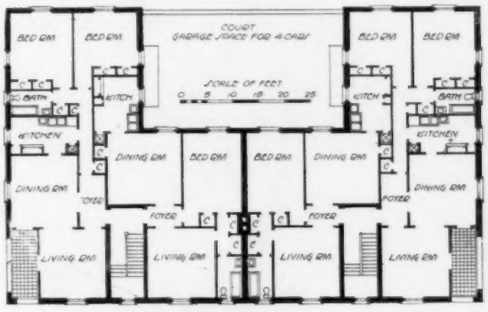
A pressure tank is used as a high pressure water supply. In detail it is a cylindrical steel tank designed to be two-thirds filled with water and the remaining third filled with compressed air. It does not need the heavy construction and the great elevation necessary for a gravity tank, but can be located inside of a building on a floor already constructed, in a penthouse or in any location not exposed to freezing weather.

Apartment Houses at Jackson Heights, N. Y.

AN EXAMPLE OF CO-OPERATIVE FINANCING BY TENANTS

ANDREW J. THOMAS, ARCHITECT

THIS group contains ten buildings, comprising in all 128 apartments. There are three units, with frontages of 83, 107 and 120 feet, respectively. A special point of interest is the openness of the plan; larger courts have been provided, yet the same amount of rental area is obtained as in apartments that cover greater ground area. The buildings have just been completed and the majority of the apartments have already been sold to tenants on a co-operative basis. A detailed discussion of the planning of this group was published in THE FORUM, *June, 1919.*



Typical Plan of 107-foot Unit

View Showing Garden Plot and Garages in Rear

Street Façade of 107-foot Unit of Apartment House Group

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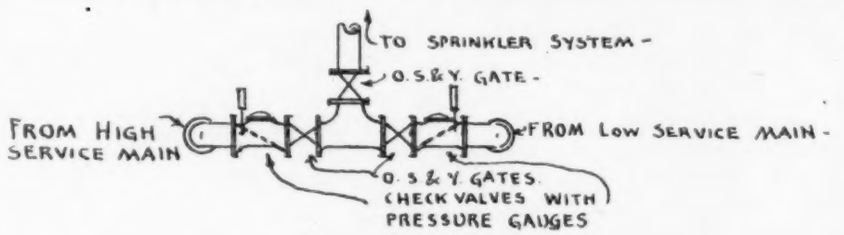

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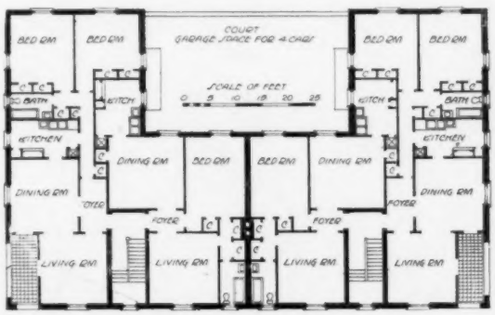

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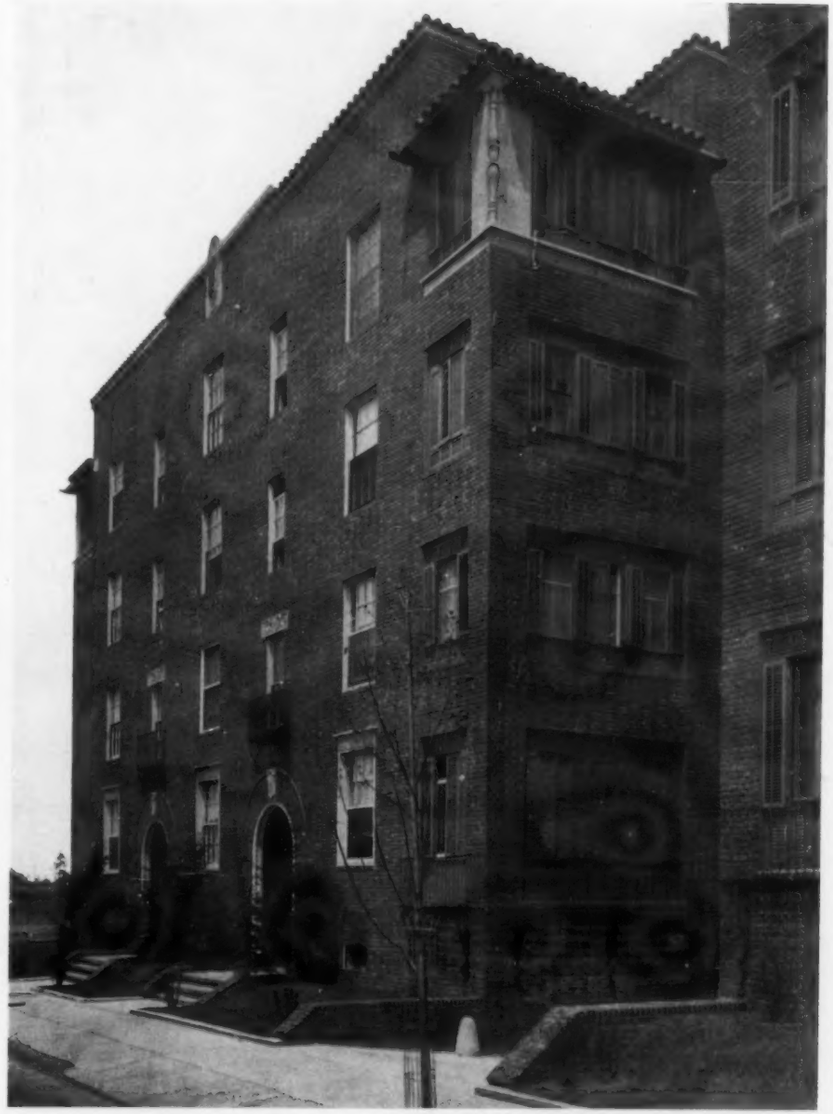
Street Façade of 107-foot Unit of Apartment House Group

DETAIL OF ENTRANCE DOORWAY



DETAIL OF FAÇADE AND SUN PORCHES

GROUP OF CO-OPERATIVE APARTMENT HOUSES AT JACKSON HEIGHTS, NEW YORK, N. Y.

ANDREW J. THOMAS, ARCHITECT

Co-operative Ownership to Meet the Present Shortage of Buildings

II. THE DEVELOPMENT AND FINANCING OF A CO-OPERATIVE BUILDING PROJECT TO-DAY

IN past years the co-operative apartment house project has been developed for reasons other than those which now promise a rapid growth of interest in this method of bringing about the construction of buildings necessary to meet the housing shortage. The reasons in the years before the war for the development of co-operative ownership were especially ascribed to the rapid increase in land values in sections of the city desirable for downtown residential purposes, and the interest of certain individuals, particularly artists, in developing, on a community basis, buildings containing special features designed to meet their requirements.

Thus we find that the average co-operative apartment in the early stages of its development in America consisted of a number of units of the studio type, together with service space and community rooms, such as picture galleries, dining rooms, lounging rooms, open to the use of all tenants and their friends.

Gradually, however, as the servant problem became more troublesome and business buildings began to crowd out the old downtown residential sections, there developed a demand for downtown apartments for the families of business men, and for what might be termed a dilettante class whose interests were chiefly in the artistic and theatrical centers.

Thus we find a second development of co-operative apartments not especially designed as studios but developed more as comfortable living quarters where the maintenance difficulties of the average city dwelling were eliminated, and where better living quarters could be obtained for less money than through ownership of a separate dwelling in the same district.

To-day we have not only these same conditions, all in an aggravated state, but we have also the very practical questions of high building costs, difficulty in obtaining building financing, and a gradual withdrawal of speculative and investment interests from the field of new buildings, all coupled with a constantly increasing housing shortage. One phase of the present-day situation was recently described by a prominent New York real estate expert in a statement that a plan has been worked out for a Fifth avenue apartment house in which a $27,000 a year apartment at the normal rental can be had for a little under $13,000 a year, taking into consideration a saving in income tax through the ownership of an apartment, provided an investment is made on a co-operative basis as follows:

Of the twenty-four apartments in this building, six will be sold at $100,000 each, the remaining eighteen being offered for rent at market prices. The total rentals on these apartments will pay the interest on mortgages, taxes and the operating cost of the building, so that a man would be able to secure an apartment, the rental value of which would be $15,000, at a total annual cost of $6,000.

He draws the conclusion, however, that only persons of wealth can enjoy the advantages accruing from the co-operative method of building ownership, and if this has been the general impression it will be one of the purposes of this article to show not only the practical methods through which the financing of a co-operative project may be developed, but also that the application of this principle is basic, and that it need not be confined entirely to people of wealth but is available to all who may have savings to invest in a home. It is safe to assume that the growing interest in this type of building finance is not entirely due to the conditions of past days, as already described, but is due largely to the possibility of eliminating considerable excess profit and making a dollar buy more housing space directly available for the tenant than is possible through the usual speculative and investment development of buildings.

We are therefore to-day facing these changed conditions in considering this project:

1. That building costs are probably two and one-half times increased over a pre-war period.

2. That land has not increased so greatly in value.

3. That it is more difficult to obtain building loans.

4. That the development of the co-operative project is not to-day so personal a matter as in the past, but is usually carried out by interested individuals who will profit by some phase of the transaction which comes within the scope of their business activity.

5. That an architect, a builder or a landlord may be the active means of developing a co-operative project to a point where benefit may be received by all persons interested.

Assuming that a stock company is formed for the purpose of providing the necessary equity, we find a possibility of admitting to the advantages of co-partnership those who may not have sufficient funds to buy stock outright. A plan has recently been worked out by several building corporations through which the purchasers of stock are required to make a first payment, and allowed several years in which to pay for stock on the installment plan at the same time occupying their apartments. The actual equity financing in such cases is done by the building corporation or by others primarily interested, and their money is returned to them by the installment payments of the actual purchasers of stock who are living in the building.

Thus we find in a recent prospectus for a large project of this nature that the financing and selling have been carried out as follows:

The Cost

In order to facilitate the comprehension of the plan, the cost of the building is made up as follows:

1. The cost of the land, with all street improvements, at a very low price.
2. The estimated cost of the buildings.
3. A profit of 10 per cent on the cost of land and building.

This cost represents about $1,430 per room of which $805 represents a mortgage and $625 is the equity; as an illustration, therefore, a 6-room apartment would cost to acquire $3,750 over and above its proportionate share of the mortgage, which would be about $4,800 additional. The cost of the 4- and 5-room apartments is in proportion. The prevailing fair market rent is paid for the apartment and the saving over the actual expenses of operation is returned in the form of dividends.

Stock

Each building which is sold will be incorporated with a stock capital equivalent to the amount of the equity above the mortgage. As an example, the 83-ft. building would be incorporated for $35,000, the mortgage on this building would be $45,000 and the total cost $80,000. The $35,000 of capital represents $625 for each room in the building. The stock can be paid for in cash or part cash and part installments over a period of six years as shown in detail hereafter. It is conservatively estimated that this stock should earn 8 per cent. Figures which are appended give the schedule of rents and the estimated income and outgo of the various buildings. Each stockholder will be a director sharing in the management.

Installment Payments

Under the installment plan of paying for stock (shown in detail hereafter), 6 per cent is charged on unpaid balances, but the stockholder will receive the full earnings on his stock while he is paying for it, which is estimated at 8 per cent. The stock is held or retained by the holding company as collateral security until paid for. Interest on unpaid balances is payable quarterly, installments monthly and dividends semi-annually.

Amortization of Mortgage

In addition to the 8 per cent dividend on the stock an allowance of 2 per cent of the amount of the mortgage is set aside out of the earnings to gradually pay off the mortgage on the property.

Management

The corporation is to act as agent and manager for the houses for a period of seven years, rendering semi-annually an itemized statement to the tenant-owners of the cost of maintenance and performing clerical work in connection with the holding corporation, charging for this service 5 per cent of the gross rent during that period.

Share in Building Separate from Tenancy

At the time of vacating the premises the shareholder may either retain his share in the building or sell it, which, of course, he is at liberty to do at any time. The assignment of the share in the building, however, does not carry with it the right, to the new buyer, of leasing the apartment; all prospective lessees are to invariably be passed upon by the holding corporation or its agent.

Leases

Each shareholder will receive a lease in the form used by the corporation which will insure him of permanent occupancy of his apartment at present rent so long as he wishes to occupy it,—with a provision that by giving notice on the 1st of July in any year he may vacate the lease the following October 1st, in which event the apartment will be let to a new tenant for the benefit of all the stockholders at the then prevailing schedule of rent.

Choice of Apartments and Selection of Owners

Choice of apartments will be given in the order of receipt of application. The corporation will exercise the utmost care in selecting the prospective owners of apartments.

Payments

A deposit of $200 will be required with each application for an apartment and 6 per cent interest will be allowed on each deposit from the date of its receipt. The balance of the cash payment is to be made at the time of passing of title.

This plan shows how co-operative interest-carrying tenancy of an apartment may be purchased on an easy-payment plan with a small first cash investment. That this plan has proved a success is shown by the fact that on the operation just described all of the apartments provided were sold, and this method of selling direct from builder to tenant at cost plus a moderate profit is evidently to be one of the successful methods used during the next few years.

As just outlined, it is not only possible to develop a co-operative project but it is possible to place the stock interest in this project with owner-tenants who have not the entire amount necessary available in cash, but who are willing to pay a rental comprising cost of operation and interest plus a sufficient amount of cash monthly to complete the installment purchase of their stock. This method places the co-operative plan in the hands of the masses and at the same time gives the speculative builder who is willing to take a normal profit an excellent opportunity to sell his buildings piecemeal rather than to be forced to depend upon the luck of the market to find an investor at today's high costs.

COST OF EACH APARTMENT AND INSTALLMENT PAYMENT

Sizes of Suites	Approximate Share Mortgage Each Apartment	Value of Equity at $625.00 per Room	Cost of Apartment	Minimum Cash Payment	Balance Payable by Installments in 6 Years	Annual Payments for 6 Years	Monthly Payments for 6 Years
6 Rooms.	$4,800.00	$3,750.00	$8,550.00	$1,500.00	$2,250.00	$375.00	$31.25
5 ,,	4,000.00	3,125.00	7,125.00	1,250.00	1,875.00	312.50	26.04
4 ,,	3,200.00	2,500.00	5,700.00	1,000.00	1,500.00	250.00	20.83

RENTAL OF EACH APARTMENT

Location	6-Room		5-Room		4-Room	120-Ft. Building	4-Room 83-Ft. and 107-Ft. Buildings	
	Month	Year	Month	Year	Month	Year	Month	Year
1st Floor.....	$92.00	$1,104.00	$77.50	$930.00	$64.00	$768.00	$58.00	$696.00
2d ,, ...	98.00	1,176.00	82.50	990.00	68.00	816.00	62.00	744.00
3d ,, ...	98.00	1,176.00	82.50	990.00	68.00	816.00	62.00	744.00
4th ,, ...	92.00	1,104.00	77.50	930.00	64.00	768.00	58.00	696.00

COST TO PURCHASE AND RENT EACH APARTMENT
(Minimum Cash Payment 6-Year Installment Plan)

	6-Room Apartment		5-Room Apartment		4-Room 120-Ft. Building		4-Room 83-Ft. and 107-Ft. Buildings	
	1st and 4th Floors	2d and 3d Floors	1st and 4th Floors	2d and 3d Floors	1st and 4th Floors	2d and 3d Floors	1st and 4th Floors	2d and 3d Floors
Annual Rent....	$1,104.00	$1,176.00	$930.00	$990.00	$768.00	$816.00	$696.00	$744.00
Installment	375.00	375.00	312.00	312.00	250.00	250.00	250.00	250.00
Average Int. on Unpaid Balance	66.00	66.00	56.00	56.00	45.00	45.00	45.00	45.00
Gross Cost.....	1,545.00	1,617.00	1,298.50	1,358.50	1,063.00	1,111.00	991.00	1,039.00
Est. Dividend, 8 Per Cent.....	300.00	300.00	250.00	250.00	200.00	200.00	200.00	200.00
Net Cost	1,245.00	1,317.00	1,048.50	1,108.50	863.00	911.00	791.00	839.00
Gross Cost per Month.....	128.75	134.75	108.20	113.20	88.58	92.59	82.58	86.58
Net Cost per Month..... ...	103.75	109.75	87.37	92.33	71.91	75.91	65.91	69.91

Returning to the general phases of the situation we find that coupled with high building cost is the condition of extreme necessity for housing and the increased ability of the average person to pay for his house. While it is true that there is a definite shortage of money for building loans, it is also true that the co-operative project developed along proper lines is more interesting to the building financier than the average straight building loan,—partly because there is greater responsibility to be found in a group of owners under this plan, and also because it is possible under this plan to make mortgage loans, a portion of which will be amortized annually.

This question of high cost also brings up the point of a sinking fund, not only to pay off a proportion of the mortgage, but to definitely counteract a possible shrinkage in replacement values. Thus in planning a co-operative venture the financing and general administration should be worked out somewhat along these lines:

1. A complete prospectus of the project should be worked out with floor plans and elevations of the building, together with a careful estimate of cost and of rentable values.

2. The project should be taken up for financing:

(*a*) With a loaning institution or individual; or, if money is not obtainable, through ordinary sources,

(*b*) With an underwriter of realty mortgage bonds; there are many companies which will underwrite a good mortgage and through their selling channels will place bonds with investors.

3. When the general plans and mortgage arrangements have been worked out the actual prospectus can be taken up with stock investors who are to be tenants. In this manner a percentage of the space in the building will be set aside for investors, usually allowing a certain number of square feet or cubic feet in the building in proportion to amount of stock purchased, the capitalization of the company being based on the necessary equity.

In figuring rental income from the space which is to be rented directly, not only maintenance cost should be liberally figured, together with vacancy loss and other contingencies, but a definite sinking fund of 2 or 3 per cent of the cost of the building should be set aside as part of maintenance cost; this fund is to accrue to the benefit of the stockholders in the building and is to be used to offset any shrinkage in replacement value which may come when the cost of building is lower.

In view of the demand for good rentable space to-day it is not difficult to obtain rents sufficiently high to meet all costs of maintenance, together with a necessary sinking fund for replacement value.

4. As stock subscriptions are taken, preliminary payments should be obtained which will be sufficient to bring to completion all working drawings and specifications for the building which should then be placed for final detailed estimate with the builder.

At this point the unusual conditions of to-day's market present a problem, and that is to ascertain the definite cost of the building. Stockholders who enter into a co-operative building project to-day must realize that the definite cost of the building cannot be ascertained until construction is complete. The promoters of the operation will find it almost impossible to get a reputable contractor to give a definite contract figure, and it will, therefore, be necessary in most cases to retain the services of an expert builder of structures of this type on a fixed fee basis, with penalty and bonus clause affecting his fee in proportion to the saving or excess in cost of the building as related to final detailed estimate.

This is a point which, to a certain extent, has hampered the development of new co-operative buildings; but, on the other hand, the obvious saving features of this method, as opposed to renting space in new buildings, are such that those who are facing a pressing demand for living or business quarters will not hesitate to risk any reasonable excess cost.

5. The project at this time will have reached a point where actual building commences and stock payments are required from stock purchasers at various stages in the progress of the building operations.

There are many points which come up for discussion in relation to a project of this nature, and on which the minds of interested persons are not clear. It is difficult in an article of this nature to discuss all the points which may arise in this connection. There are, however, some questions which will naturally be asked, together with replies which form the consensus of opinion of persons experienced in this type of building development and such replies may be helpful in removing misunderstandings.

Who Handles Finances and Assumes Business Responsibility?

The most successful method is to place the entire handling of the project in the hands of a real estate management company experienced in such work. They will be responsible for all rental collections, maintenance and disbursements, and will make statements to a committee of the owners. This committee, in turn, makes a statement to the individual owners as to gross income, expenses, dividends, amortization payments and sinking fund allotments.

Must an Owner Occupy His Apartment?

No. The owner under to-day's conditions will probably gain the greatest benefit by occupying the apartment. He should, however, be in a position to sub-let the apartment at any rental equal to or above the average rental imposed throughout the building. The tenant must be acceptable to the owners' committee, however. Similarly, if an original owner sells, the buyer must be acceptable to the committee. For instance, in the case of one co-operative apartment building erected some years ago in New York, the owner of an apartment having gone abroad rented the apartment on a basis which pays him an annual cash return of about 15 per cent on his investment. Incidentally, the value of land and building has increased to the point where he could sell his apartment to-day at 100 per cent over what it cost.

Is Stock in This Type of Investment Negotiable Collateral?

Stock in this type of investment, which carries with it a perpetual lease to a definite space in the building, is certainly negotiable collateral under the conditions imposed by the agreement. It is in no way different from the ownership in an individual property. Thus if it is shown that there is a definite equity in this holding, and that this investment is paying a good return, either in market rentable value, or in actual rental if the owner is not occupying the apartment, this constitutes sound collateral in exactly the same manner that a mortgaged dwelling is collateral. It has the same collateral security value and the same transferable market value as a dwelling subject to occupancy restrictions. An owner should experience no difficulty in selling his stock holdings at any time there is a reasonable demand for space. During the next few years stock ownership should prove a valuable asset because of the definite advantages it entails.

What Are the Advantages to be Gained —

(a) As opposed to the ownership of an individual dwelling?

1. Co-operative ownership is wholesale buying of building space, eliminating land and building increment profit, speculative profit and financing profit.

2. If the owner lives in the apartment, he has none of the responsibilities of property management or the difficulties of maintenance necessary in an individual dwelling.

3. He has the advantage of living in a community where land cost would be prohibitive for an individual dwelling.

4. He has the privilege of selecting the type of his neighbors.

5. He has none of the disadvantages of a tenant subject to the whims or profiteering tendencies of a landlord.

6. He is, in fact, a landlord receiving benefits from space rented out by him at market values, the profits on which go to reduce his own rental.

(b) As opposed to renting an individual apartment?

1. He pays none of the excess cost due to speculation, financing, income tax, property charges, profiteering, etc.

2. He is not subject to eviction.

3. He can deliberately choose his neighbors.

4. He enjoys a definite financial saving due to the conditions here described and consequently can occupy at the same actual annual cost a much larger and more desirable space than his income would permit on a straight rental basis under today's conditions.

A Definite Example of Co-operative Apartment Purchase

IN connection with co-operative apartment financing it will be interesting to cite as an example the experience of an architect who purchased, as a personal investment, stock in a co-operative apartment house.

The apartment house in question was a 7-story building, 90 by 100 feet, located in New York and containing 14 apartments of 7 rooms and 3 baths each, and 14 apartments of 4 rooms and 3 baths each. This building was developed by a promoting company receiving a promoter's fee which was added to the cost of the building. A stock company was formed representing the ownership of the equity in the building and stock was sold carrying permanent leases to half the apartments in the building.

Thus stockholders held the leases of 14 apartments, leaving 14 apartments to be rented at prevailing rentals in order to cover carrying charges. The equity in this building worked out so that the large apartments were sold for $8,500 and the small apartments $4,500. Of this amount 10 per cent was payable before the construction of the building, and upon the signing of the stock application, while the balance was payable in the same manner as a building loan, 20 per cent at each of various periods during construction until the final payment was made when the building was completed.

The architect in question purchased stock entitling him to a permanent lease on one of the larger apartments. His investment was $8,500 and to this he added $1,500 to be expended for unusually good decorations and electric refrigerator and other additional improvements. As he did not wish to occupy the apartment, he exercised the privilege accorded to all purchasers in co-operative ventures of leasing his apartment for a considerable number of years to a tenant acceptable to the owners' committee.

At the time of purchase the established rental of an apartment of this type in the neighborhood in question was $1,700 a year. The owner's rental, when the building was completed, was estimated at 40 per cent of this amount, or about $700, which was subsequently increased to $1,020 annually in order to effect the retirement of part of the mortgage. At present the owner of this apartment is paying an owner's rent of $1,020, but is receiving from his tenant a rental of $2,800 on his lease which still has about two years to run. It is interesting to note that the apartment on a lower floor in the same building, being exactly similar in design, is now renting for $4,500 a year.

This has proved an excellent investment, as the profit to the owner of the apartment is over $1,700 a year on an investment of $10,000. If rented at prevailing figures, the profit would represent 30 per cent of the investment. Consequently the actual value of this apartment has increased with the increased value of the building to a point where it is easily salable at twice the amount invested.

This building has operated smoothly over a period of years. Directly in charge of its operation and maintenance is a committee of owners who, in turn, have placed the management of the building and the collection of rentals in charge of an established agency which reports monthly and renders a financial statement every three months.

Elements of Increased Building Cost

ONE of the difficult features in dealing with clients in architects' offices to-day is the almost incredulous amazement with which they receive information as to the actual increase in the cost of building. In answering the resulting questions the architect is called upon to have ready reference as to increased cost in various types of materials and in labor.

A special report recently submitted by Mr. Charles A. Chase, a member of the sub-committee on building of the Mayor's Housing Conference Committee of New York, is of particular interest in that it carefully itemizes the actual increase in cost of various items. It is presented herewith :

Table Showing Schedule of Wages and Percentage of Increase in Building Trades, 1914-1920

	Amount per Hour 1914	1920	Per Cent of Increase
Auto truck drivers	$0.46⅞	$0.75	60
Bricklayers	.75	1.25	66⅔
Bricklayers' laborers	.37½	.87½	133⅓
Bluestone cutters	.56¼	1.12½	100
Bluestone laborers	.37½	.78⅛	108⅓
Bluestone yardmen	.28½	.78½	177¾
Carpenters	.62½	1.12½	80
Carpenters' laborers	.25	.62½	150
Common laborers	.18¾	.75	300
Cement finishers	.62½	1.12½	80
Cement laborers	.37½	.75	100
Engineers in stone yards (per week)	25.00	42.00	68
Electricians	.60	1.12½	87½
Electricians' helpers	.27½	.68¾	150
Elevator constructors	.80	1.12½	40⅜
Elevator constructors' helpers	.62½	.87½	40
Freestone cutters	.68¾	1.12½	63⅔
Freestone planermen	.56¼	1.00	77⅘
Freestone sawmen	.40⅝	.78⅛	92⅓
Freestone laborers	.37½	.78⅛	108⅓
Freestone setters	.75	1.25	66⅔
Freestone derrickmen	.50	1.00	100
Freestone carvers	.81¼	1.25	54
Granite cutters	.56¼	1.12½	100
Granite laborers	.37½	.78⅛	108⅓
Iron workers	.62½	1.12½	80
Iron workers' helpers	.43¾	1.00	128½
Marble cutters and setters	.68¾	1.12½	63⅔
Marble carvers	.75	1.25	66⅔
Marble polishers	.56¼	1.66¼	89
Marble cutters' helpers	.43¾	.87½	100
Mosaic and terrazzo workers	.56¼	1.00	77⅘
Mosaic and terrazzo helpers	.34⅜	.81¼	136⅓
Metal lathers	.68¾	1.25	82⅛
Plasterers	.75	1.25	66⅔
Plasterers' laborers	.37½	.87½	133⅓
Painters	.62½	1.12½	80
Plumbers	.62½	1.12½	00
Plumbers' helpers	.25	.50	100
Plumbers' laborers	.25	1.00	300
Roofers	.62½	1.12½	80
Roofers' helpers	$0.25	$0.62½	150
Stone masons	.62½	1.25	100
Steam fitters	.68¾	1.12½	63⅔
Steam fitters' helpers	.37½	.87½	133⅓
Sheet metal workers	.62½	1.12½	80
Tile setters	.75	1.12½	60
Tile setters' helpers	.37½	.75	100
Team drivers	.37½	.62½	66⅔

Table of Increased Percentages in Cost of Principal Building Materials, 1914-1920

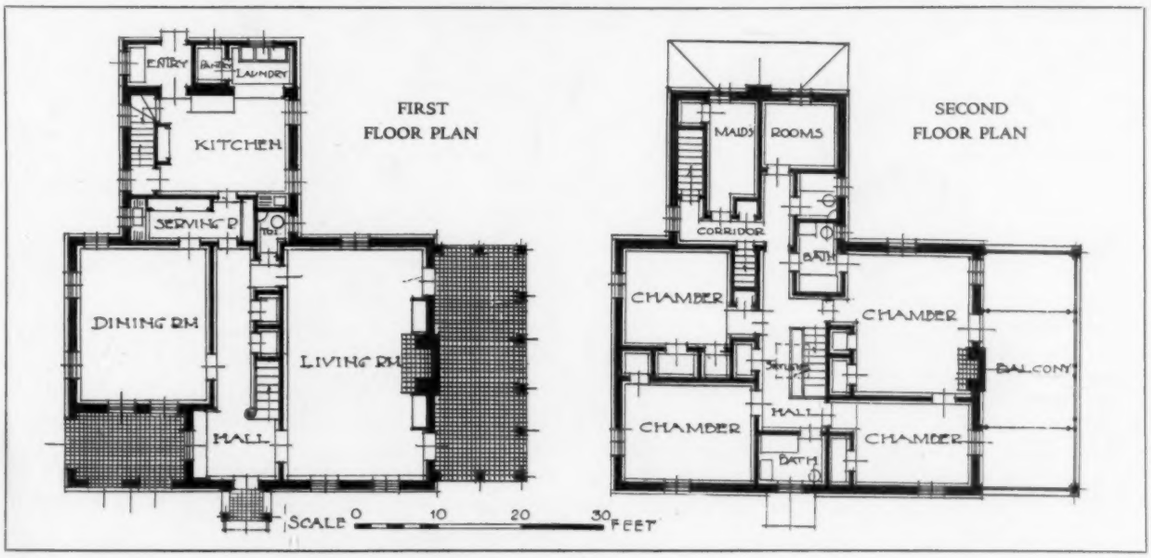
Material	Per Cent	Material	Per Cent
Dressed chestnut	366⅔	N. C. roofers	226
Dressed plain oak	366⅔	N. C. underfloor	237½
Dressed hazel	361⅛	Clear quartered oak floor	263⅔
Dressed whitewood	350	Y. P. steps	200
Dressed cypress	330	Plain oak flooring	266⅔
Dressed white pine	300	Maple oak flooring	380
Maple oak flooring	380	Electric lighting fixtures	125
Plate glass	300	Electric wiring	125
4-inch C. I. fitting	351	Trim hardwood	150
28-gauge galvanized	319	Trim softwood 100 to	120
Clear maple flooring	353⅓	Birch doors	110
Y. P. flooring	312½	Fir and cypress door	100
Clear plain oak floor	314	Sash	100
Tiles	200	Sheet glass	100
Hardware	200	Wire glass	150
Granite	250	Boilers	160
Steel	200	Pipe	140
Parquet floors	200	Excavation	100
Radiators	250	Enamel sink	187½
Fittings	225	Enamel bath	193
Lead bends	237	Enamel basin	194
Lead traps	255	Soapstone wash trays	147
Galvanized boilers	254	Lead	138½
Washdown W. C.	255	Oil	153⅓
Turpentine	300	Varnish	114²⁄₇
Vermont marble	200	Soft sheet copper	100
Tennessee marble	175	Wire glass sized	191¾
Italian marble	125	Ribbed glass	181
Cold rolled copper	100		
Slate	200		

The general increase in percentage of cost of building materials since 1914 is as follows, based on prices at that time :

June, 1915	3 per cent
June, 1916	10 per cent
June, 1917	23 per cent
June, 1918	55 per cent
March, 1919	66 per cent
July, 1919	57 per cent
August, 1919	82 per cent
September, 1919	83 per cent
October, 1919	90 per cent
November, 1919	92 per cent
December, 1919	114 per cent
January, 1920	120 per cent
February, 1920	126 per cent
March, 1920	130 per cent
April, 1920	140 per cent

The House of Pierre Jay Wurts, Esq., Englewood, N. J.

HAYS & HOADLEY, ARCHITECTS



EDITORIAL COMMENT

THE SITUATION CONFRONTING BUILDING

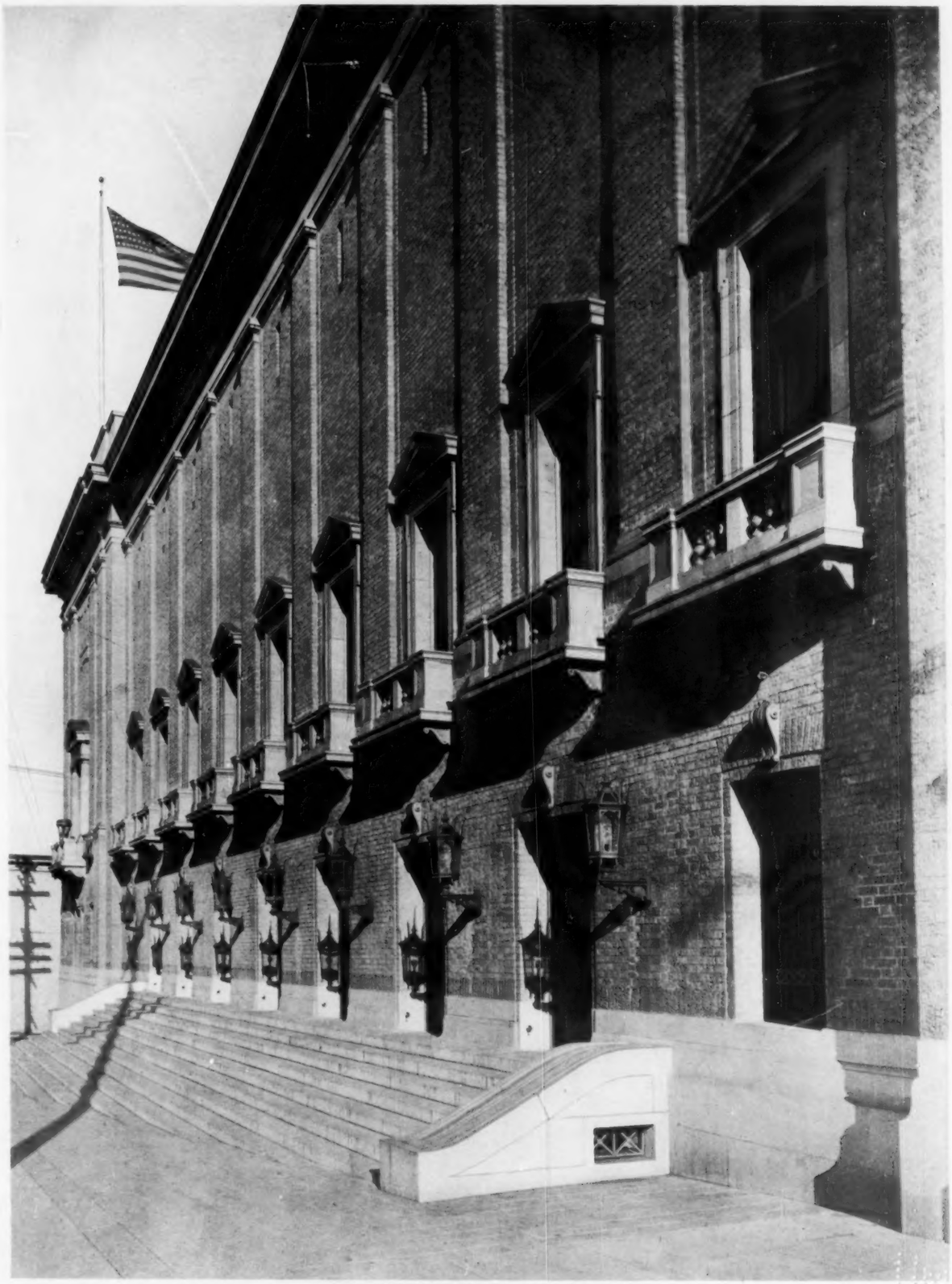
THE first four months of this year exhibited abnormal activity in building construction which was particularly evident in the field of industrial work. A reaction has now set in which is quite general throughout the country and there appears a definite intention to curtail building. At first thought it may seem detrimental to the building industry that any lessening of activities should occur but, upon analysis, there appear certain definite advantages in such a policy.

There have in the past few months been absolutely no standards that would serve to govern the price or speed with which construction work might be carried on. Large building contracts were put under way in the face of a great shortage of material and serious difficulties in transportation, with the result that prices of materials, already high, climbed to new heights under the pressure of demand. Building labor, depleted in a large measure by the employment of many building mechanics in other industries, and strongly organized, was given the opportunity of breaking contracts and enforcing the payment of outrageously high wages due to the general demand for their services. The combination of these three cost increasing elements gradually developed a situation in building which was not looked upon as desirable by financial institutions, and with the Federal Reserve Board's insistence on the curtailment of credit expansion, financial support for building has been largely withdrawn in many centers.

These are the factors that have brought about the difficulty; and while diminished activity is not usually looked upon as a happy prospect, there is promise that out of the present situation will come several adjustments that will mean better and more stable conditions. The very great demand for buildings has in no measure been met by the construction now under way. In the face of a general demand it is not reasonable to suppose that activity will long be withheld if conditions are in any way favorable for construction.

In the material manufacturing field the biggest element of distress is the inadequacy of transportation. It matters little how much is done in the way of increasing production if distribution cannot be had, and at the time of this writing the building material interests are suffering under what amounts to an embargo against building materials by the priority ruling of the Interstate Commerce Commission which assigns to the use of coal producers all of the open top freight cars for a period of two months ending August 21. These are the cars that are needed also to ship materials that are wanted for necessary highway and building construction. With this preferential ruling to the coal producers the distribution of building supplies is practically brought to a full stop. There is undeniably a shortage of coal in many sections of the country and it is important that the deficiency be made up; but while the domestic shortage continues, even under the present favorable shipping arrangements, the tonnage figures of coal exported steadily increase. The building material people can very rightfully consider that they are being discriminated against and in their efforts to have the ruling rescinded they should be given the vigorous support of every one interested in the welfare of the building industry. During the war every citizen was willing to make sacrifices for the common good and priority rulings and other orders were accepted as necessary, but to-day the need for autocratic measures does not exist and one industry should not receive preference from the government at the expense of others no less essential.

The process of deflation which is slowly developing through the curtailment of credit is, of course, being felt in lines other than building. The extravagant demand of the public for all types of merchandise rather suddenly came to an end, with the result that dealers were caught with large, high priced stocks, orders for future deliveries were canceled and requests from the banks for reduction of loans brought about sharp cuts in prices in order to liquidate stocks. The activities in such basic commodities as wool, cotton and leather have been greatly reduced and manufacturing plants using these raw materials are running on short time or closed down entirely. This is releasing many workers who formerly were engaged in the building trades and the effect is that the extreme shortage of help in the building industry is gradually being changed to a reasonable surplus. This will have a steadying effect on building labor because, irrespective of the great value the workers place upon their strongly organized position, their success in gouging high wages in return for minimum production has not been due essentially to their organization but to the natural law of supply and demand. With demand decreasing and supply increasing we may expect to see gradually come about an enforced change in their attitude. There is already in evidence a strong movement among employers in the building trades to bring about open shop conditions in centers that have been union ridden, and if the present slack in building is responsible for nothing else than bringing labor down to earth, any resultant sacrifice will have been wisely made.



DETAIL OF ENTRANCES ON MAIN FACADE

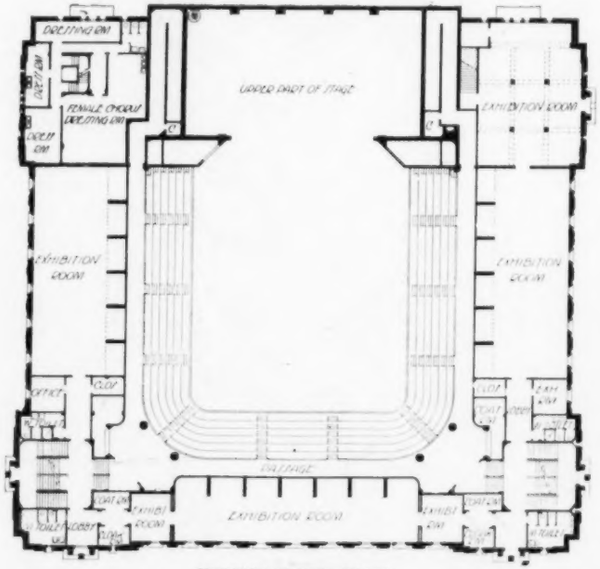
PORTLAND PUBLIC AUDITORIUM, PORTLAND, OR

J. H. FREEDLANDER, A. D. SEYMOUR, JR., ASSOCIATE ARCHITECTS

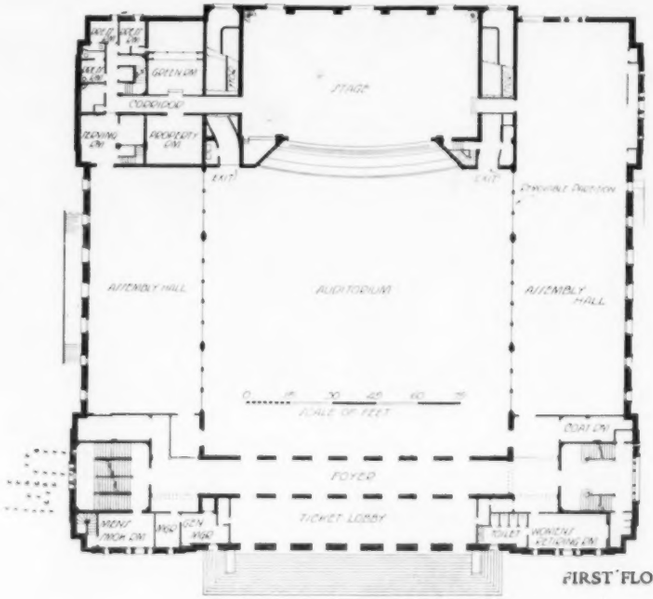
GENERAL VIEW

PORTLAND PUBLIC AUDITORIUM, PORTLAND, ORE.

J. H. FREEDLANDER, A. D. SEYMOUR, JR., ASSOCIATE ARCHITECTS



SECOND FLOOR PLAN

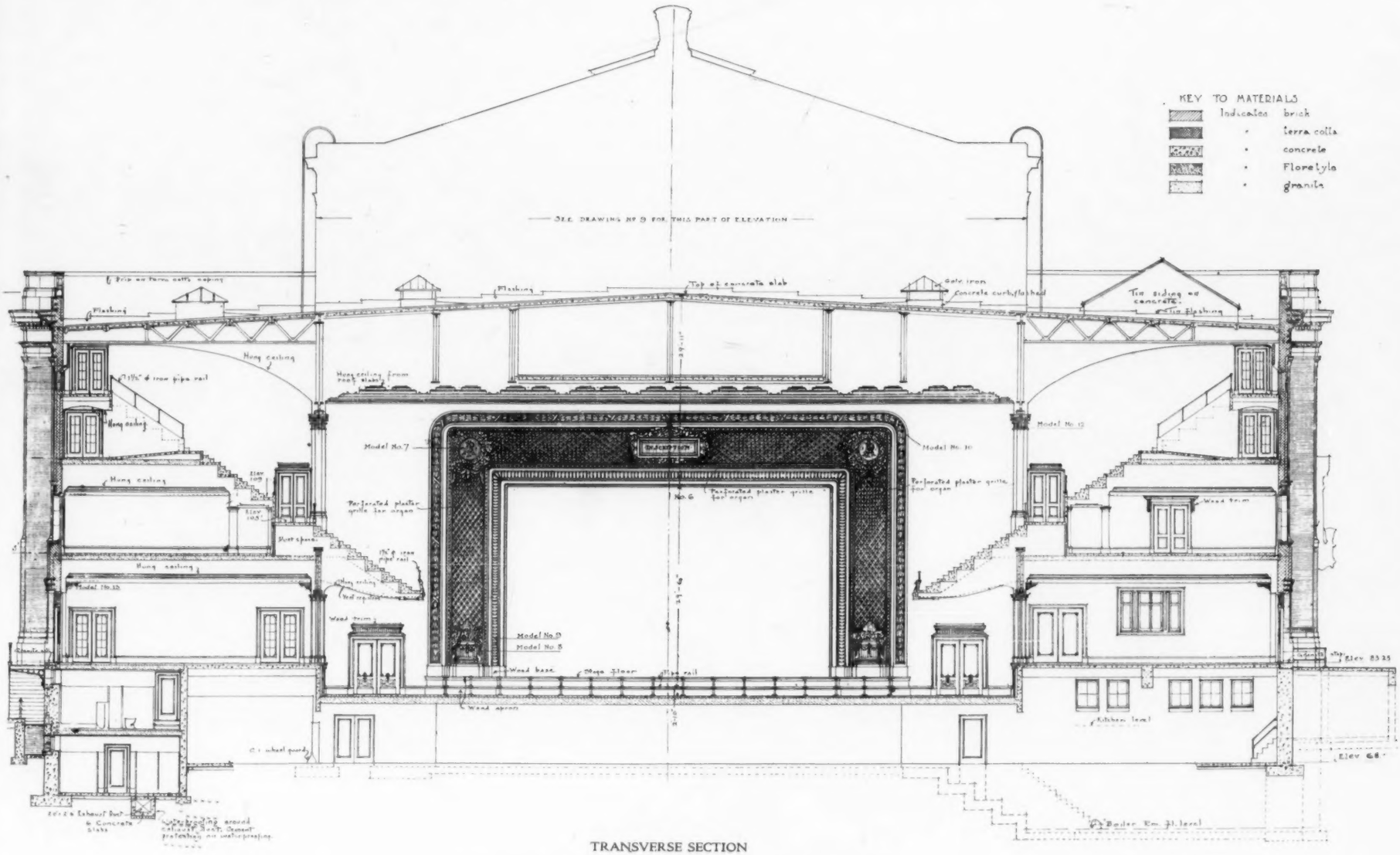


FIRST FLOOR PLAN

DETAIL AT END OF MAIN FACADE

PORTLAND PUBLIC AUDITORIUM, PORTLAND, ORE.

J. H. FREEDLANDER, A. D. SEYMOUR, JR., ASSOCIATE ARCHITECTS

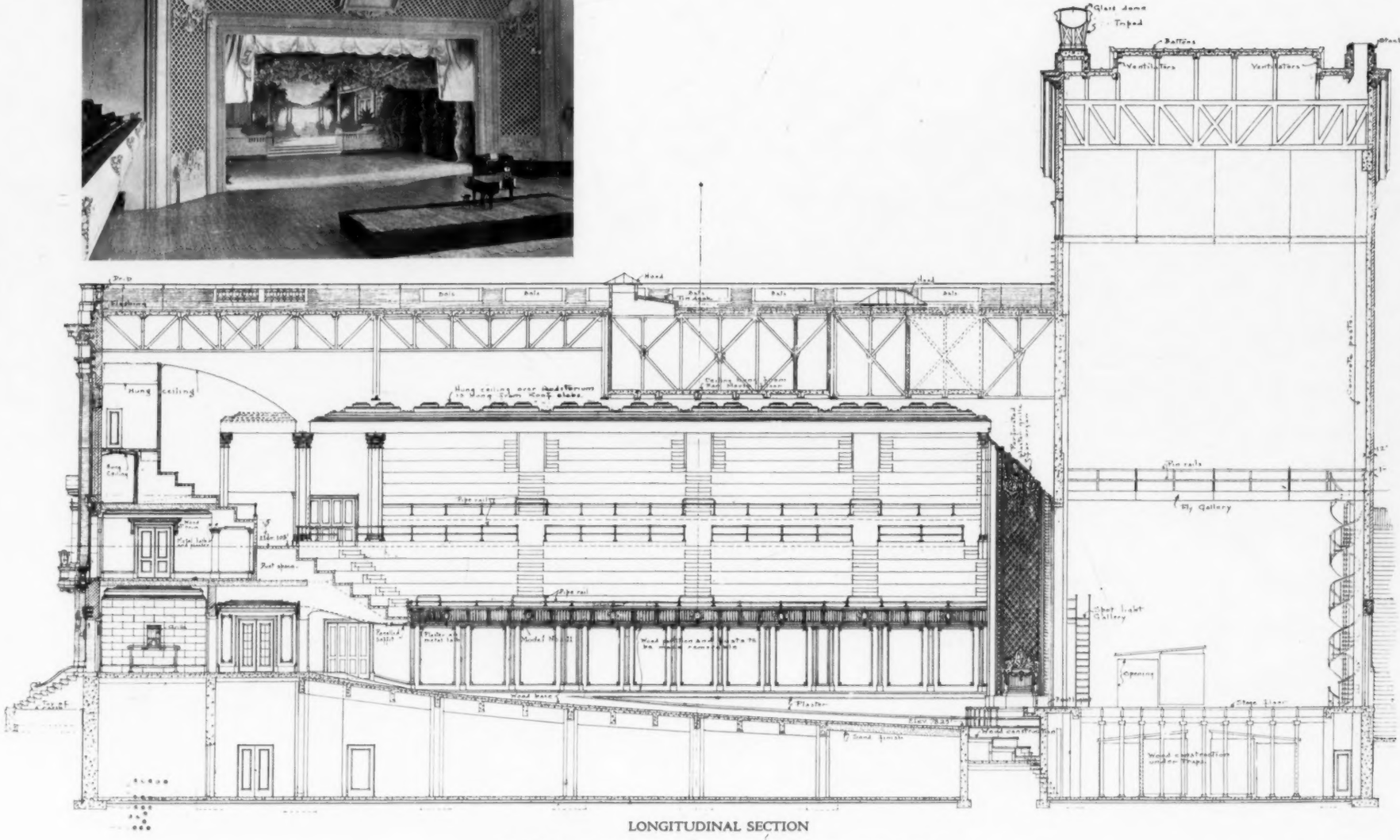


TRANSVERSE SECTION

PORTLAND PUBLIC AUDITORIUM, PORTLAND, ORE.

J. H. FREEDLANDER, A. D. SEYMOUR, JR., ASSOCIATE ARCHITECTS

INTERIOR ARRANGED FOR EXHIBITIONS



LONGITUDINAL SECTION

PORTLAND PUBLIC AUDITORIUM, PORTLAND, ORE.

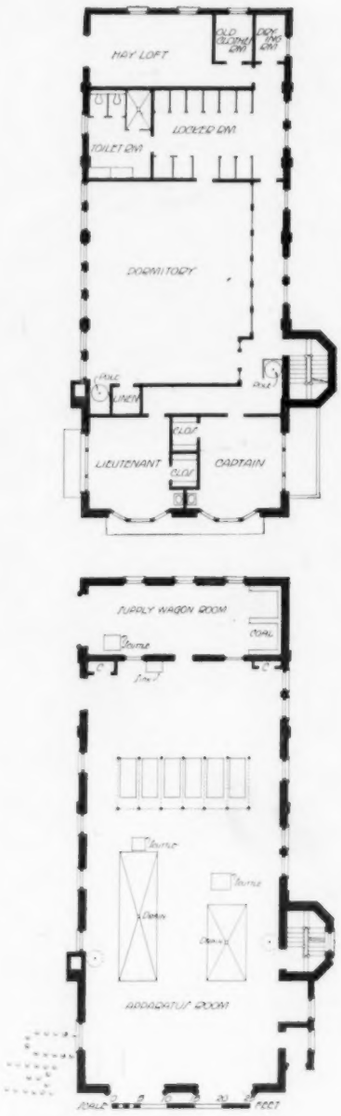
J. H. FREEDLANDER, A. D. SEYMOUR, JR., ASSOCIATE ARCHITECTS

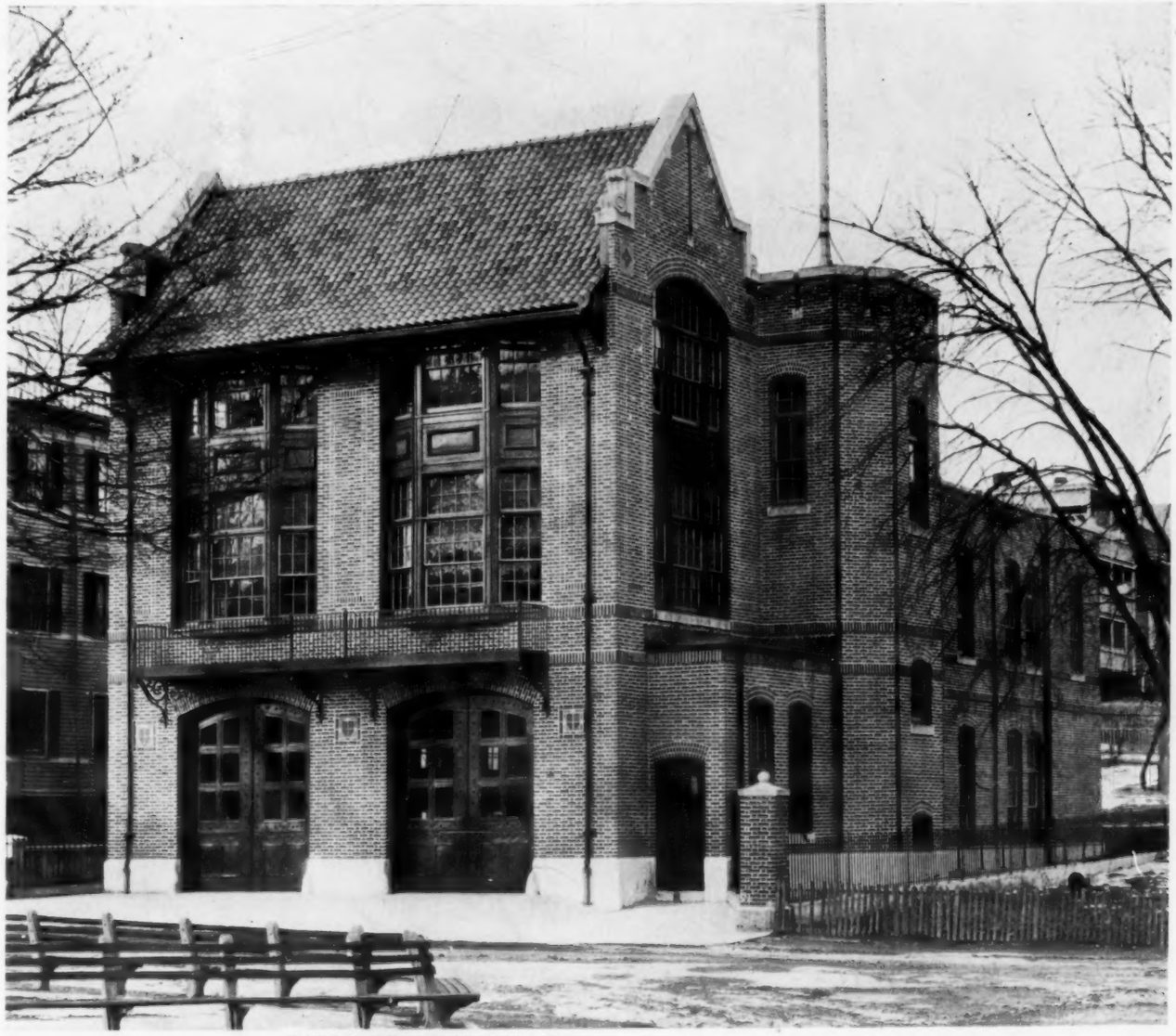
PROSCENIUM FROM THE AUDITORIUM

BALCONY AND PARQUET FROM THE STAGE

PORTLAND PUBLIC AUDITORIUM, PORTLAND, ORE.

I. H. FREEDLANDER, A. D. SEYMOUR, JR., ASSOCIATE ARCHITECTS



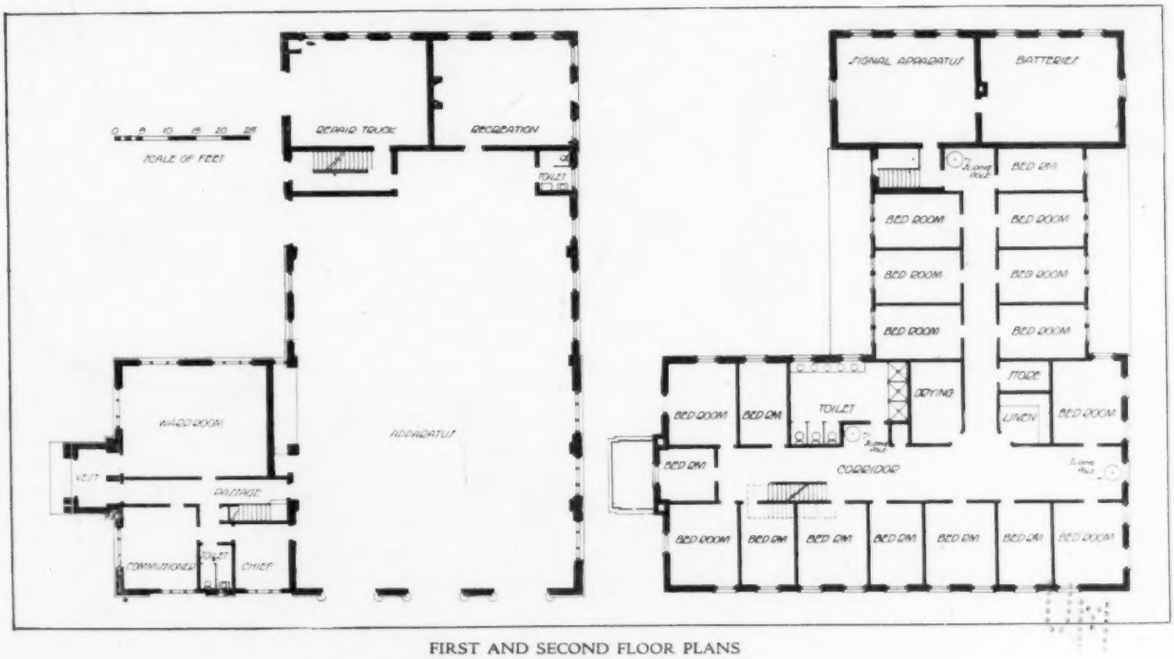


FLOOR PLANS AND MAIN FACADE

FIRE STATION FOR THE CITY OF BOSTON, BRIGHTON, MASS

MAGINNIS & WALSH, ARCHITECTS

GENERAL VIEW


SCALE OF FEET
REPAIR TRUCK
RECREATION
TOILET
WARD ROOM
APPARATUS
VAULT
PASSAGE
COMMUNICATIONS
TOILET
CHIEF
SIGNAL APPARATUS
BATTERIES
BED RM.
BED ROOM
BED ROOM
BED ROOM

DETAILS OF REAR AND END

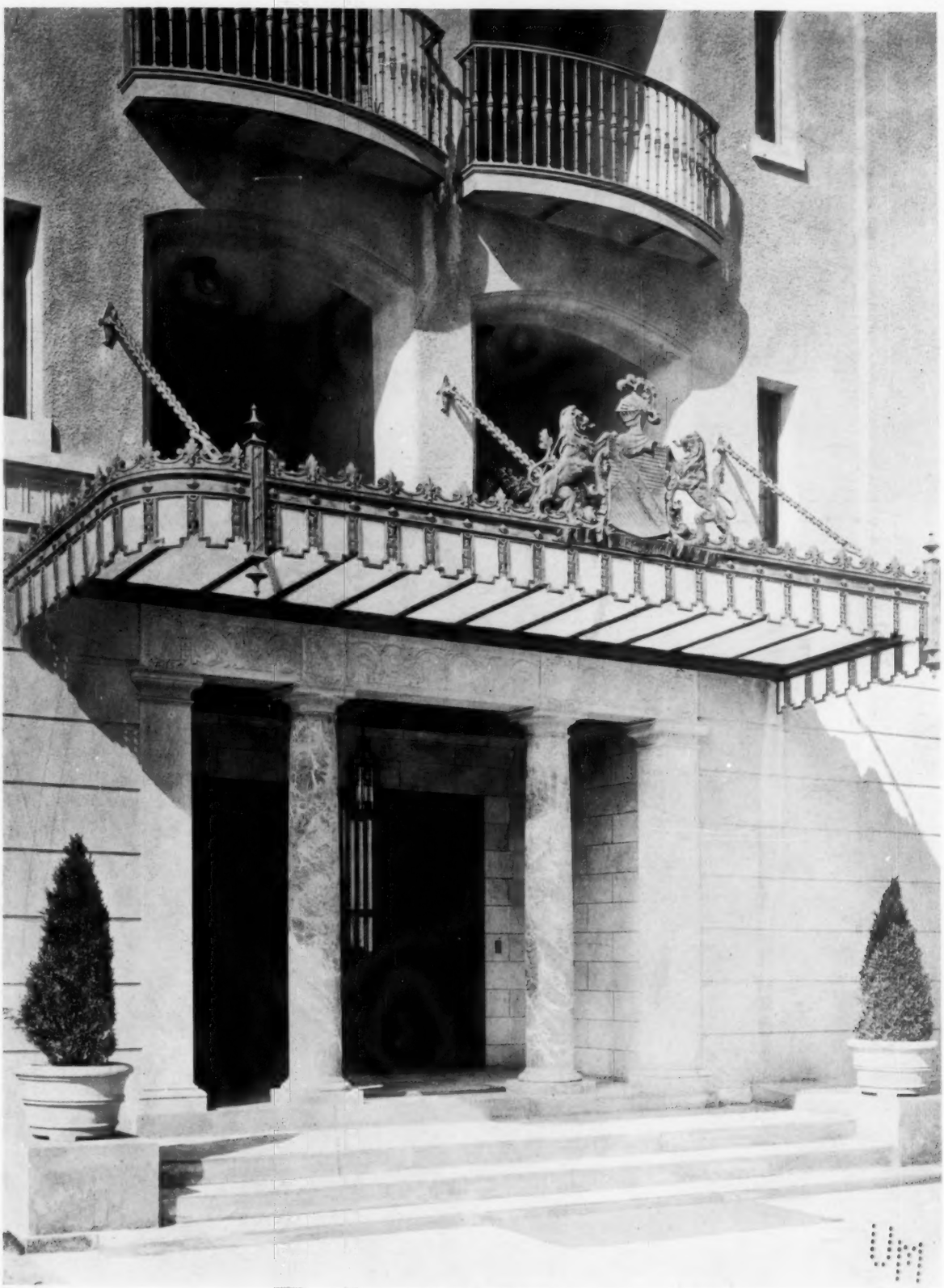
CENTRAL FIRE STATION, MALDEN, MASS.

CHARLES R. GRECO, ARCHITECT

GENERAL VIEW AND TYPICAL FLOOR PLAN

EMERSONIAN APARTMENTS, BALTIMORE, MD.

JOSEPH EVANS SPERRY, ARCHITECT

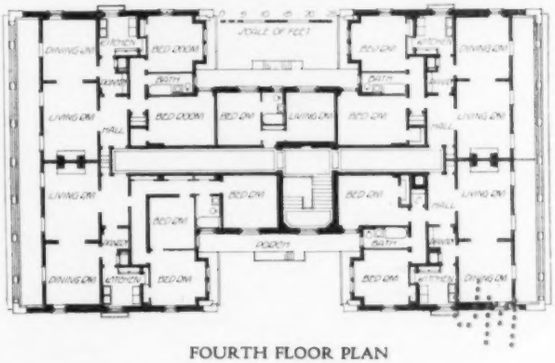


DETAIL OF ENTRANCE

EMERSONIAN APARTMENTS, BALTIMORE, MD.

JOSEPH EVANS SPERRY, ARCHITECT

FIRST FLOOR PLAN



FOURTH FLOOR PLAN

CARLTON APARTMENTS, BALTIMORE, MD.

PARKER, THOMAS & RICE, ARCHITECTS

VIEW OF ENTRANCE FRONT

VIEW OF HOUSE AND GARAGE

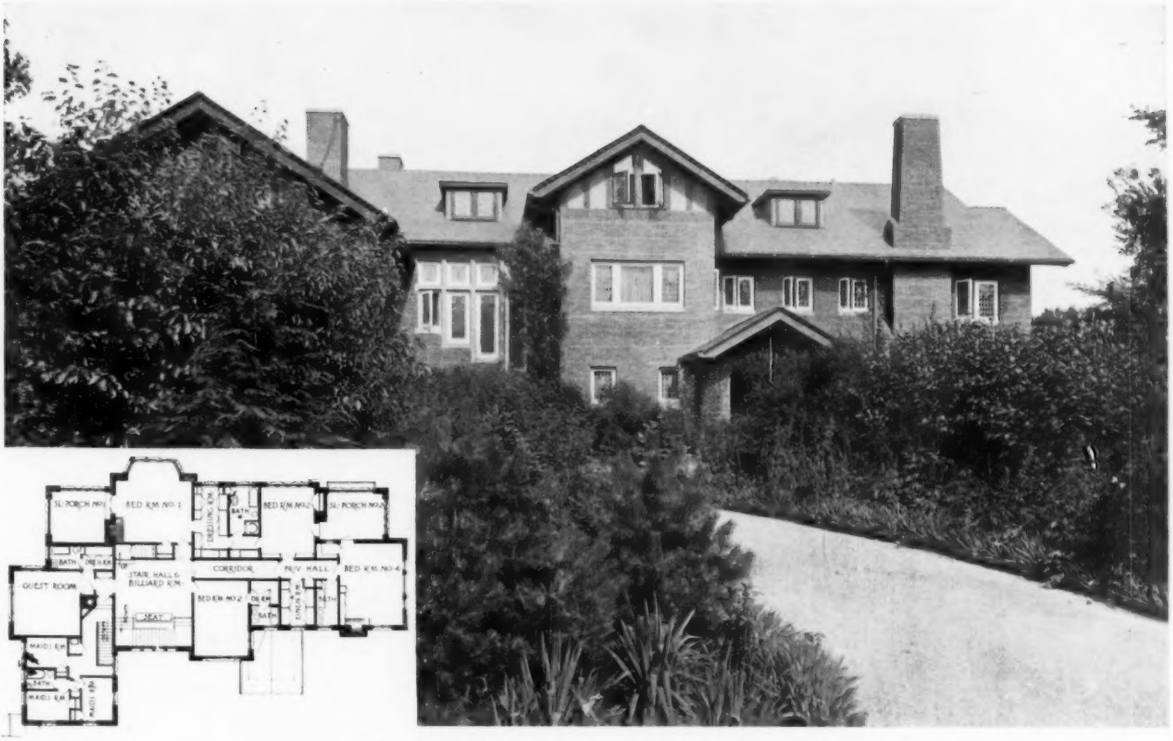
HOUSE AT ROCKFORD, ILL.

CHATTEN & HAMMOND, ARCHITECTS

DETAIL OF LIVING ROOM END

HOUSE AT ROCKFORD, ILL.

CHATTEN & HAMMOND, ARCHITECTS



SECOND FLOOR PLAN AND VIEW FROM APPROACH

FIRST FLOOR PLAN AND ENTRANCE FRONT

HOUSE OF N. W. WILLIAMS. ESQ., EVANSTON, ILL.

SPENCER & POWERS, ARCHITECTS

VIEW OF GARDEN FRONT

STAIR HALL

HOUSE OF N. W. WILLIAMS, ESQ., EVANSTON, ILL.

SPENCER & POWERS, ARCHITECTS